

# The Iron Age

## A Review of the Hardware and Metal Trades.

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### Testing Machine for the School of Mines.

The accompanying illustrations represent the testing machine manufactured by Messrs. Fairbanks & Co. for the School of Mines, Columbia College, and exhibited at the late fair of the American Institute.

The scale is composed of a series of multiplying levers, having a beam similar to the ordinary platform scale. It also has a combination of gears and screws, so arranged that by turning a hand-wheel the pressure or strain is applied to the platform through the specimen which is being tested. This, of course, causes the beam to rise, when, by an arrangement of clock-work, the poise is moved to a point on the beam indicating the number of pounds strain or pressure on the specimen. When this point is reached the beam drops and the poise remains at the point where it is when the beam commences to fall. If more strain is then applied the beam again rises and the poise moves on as before, and so on, until the specimen is crushed or broken, when the figures on the beam at which the poise stops indicate the exact number of pounds strain or pressure at which the specimen gave way. The parts of the apparatus shown in Fig. 1 are arranged so that not only pressure but tension may be applied to any specimen under examination. The ingenious arrangement by which the poise is made to advance when the beam rises, and to stop when the beam falls, is shown in Fig. 2, in which A is the rod which connects the beam with the multiplying levers, B is a sliding poise, which, in the use of the machine, is set to a point that, in the judgment of the operator, approximates nearly to, but does not exceed, the measure of the stress desired to be applied to the material under examination. When this is done, and the stress is applied to the substance to be tested, the beam will rise. In so doing, the lever, C, engages a stop at D. This lever being pivoted at E, its inner end will be made to rise by its engagement with D, and, in so doing, the rack teeth formed on the inner arm of the lever, C, are made to disengage from one of the toothed wheels of a train of clock-work. The weight, F, then begins to descend, and being connected by a cord with the clock work, and through that to the poise, G, the latter is made to pass out toward the end of the beam. The clock work is attached to the end of the beam itself, and vibrates with it. The office of the clock work is simply to retard the motion of the weight, so that it shall run down slowly and move the parts, G, slowly toward the end of the beam. To this end the clock work drives a fly, H, similar to the fly used to retard the motion of the striking weight in common clock work. As soon as the bar begins to descend the lever, C, which is counterpoised on its inner end, drops by its own weight, and, stopping the clock work, leaves the poise, G, where it is at the time the beam begins to descend.

### The Iron Industries of Wilmington.

The report of the Wilmington Board of Trade for 1873 contains the following:

#### IRON SHIPBUILDING.

Whatever depression may have been felt in other branches of our business, this one has been uniformly active and successful; our yards have been constantly and fully employed, and the prospect is good for the future.

Wilmington has cause to be proud of the success of her iron ship builders, who were the first in the field in this country, and who have been uniformly successful in building ships, that have, in all emergencies, proved themselves staunch and reliable. From a comparatively small beginning, this has grown to be one of our largest and most successful industries. With its prosperity, we have prospered; and when it has been dull (as it seldom has) our other business has felt it, decidedly. The number of mechanics and tradesmen engaged in building and supplying these steamships is so large and varied that the interest in the success of this branch is general rather than confined to the proprietors of the ship yards themselves; and while the business has been carried on without the noise and show that so generally accompanies enterprises of this kind, yet its success has been of that permanent nature that will, in all probability, keep it in successful operation when more pretentious, but less capable, establishments shall be reckoned among the things that were. There is probably no branch of business carried on in this part of the country which engages so much attention as this, and upon which the future of our mechanical classes so largely depends. So soon as it is demonstrated that we can successfully compete with the Clyde builders, in the production of iron steamships, as to cost (for we already excel them as to quality), there will be removed to our shores one of the most profitable and extensive branches of industry in the world—affording employment to thousands of heads of families, and encouraging the manu-

facture of immense quantities of iron. The proprietors of these ship building establishments hold in their hands, to a greater degree than the same number of men in any other business, the future of our city—their success is our success, in a material point of view. Judging the future by the past, the problem is in safe hands, and, unless the appearances in the old world are very deceiving, we shall not have to wait long to see the price of iron in the two countries brought near enough together to

and wealth, the enormous quantities of agricultural products, that its rich, inexhausted soil annually yields for Eastern and foreign consumption, must be brought to the seaboard for use, for shipment and exchange. Merchandise and machinery must go back and the population must be moved speedily and comfortably; these facilities for transportation must increase with the growing demands of the country. More lines must be built, and more cars to stock them. Private enterprise can do

not too much, we think, to claim that the persistent efforts of this Board to attract attention to the advantages our city offers for this industry, have produced good results. In addition to the extensive works at Edge Moor, to which allusion has been made in preceding reports, we have to record the foundation of two more large enterprises of a somewhat similar nature in our city limits; namely, the extensive works already begun by the McCullough Iron Company, on the property known as "the

at low rates for a term of years, to locate on the line of some one railroad, away from the reach of competition, have learned by bitter experience, after the term expires, that they paid dearly for the gift, and that their new tariff of rates soon made the first one very high; but this knowledge always comes too late for service, as the investment is then too great to be sacrificed, and so, unwittingly, the transportation company is made a full partner in the profits, without liability for losses. The manufacturers locating in Wilmington avoid all this danger. If railroad freights are too high, he can use the water; and if one vessel will not make the right rate, another may; at any rate his independence is secured, and he is master of the situation rather than the corporation or individual whose business it is to carry his freights. Already we have three powerful competitors for our coal trade, and the prospect of the addition, soon, of a fourth. It is this vigorous competition that affords to the manufacturer such a decided advantage, and this we claim to have to a very great degree. Wilmington has not been, and never can be, captured and held by any one of the great railroad giants that are now struggling for the mastery. This will always be contested ground, and the advantages arising therefrom must accrue to the manufacturer in low freights, and to the consumers of coal and iron, in low prices. This single advantage alone should decide the point in our favor, but when we add to that, the presence of a large population skilled in every branch of the mechanical arts, a cheap and economical city in which to live, a climate unexcelled, and social and educational advantages of the best kind, what more need we say?

To the manufacturer of iron, then, we can and do offer advantages of the first importance, and when this monetary difficulty passes away, and the capital that has sought high rates of interest in railroad bonds finds its way back into the channels of legitimate business, we trust more companies will be started for the manufacture and working of iron, and that Wilmington will, ere long, take the rank that she should among the iron working cities of the country. Every mill started here for the manufacture of iron, helps to bring a consumer to use it. The condition of the iron interest in the country generally can hardly be told during the excitement just now prevailing, but no observing man can fail to see in the depressed state of the trade in Europe, that our opportunity is not far away, and that unless we make some great blunder, or overreach in some way, the iron trade must soon be one of the greatest sources of our national wealth, and the most prominent of our industries.

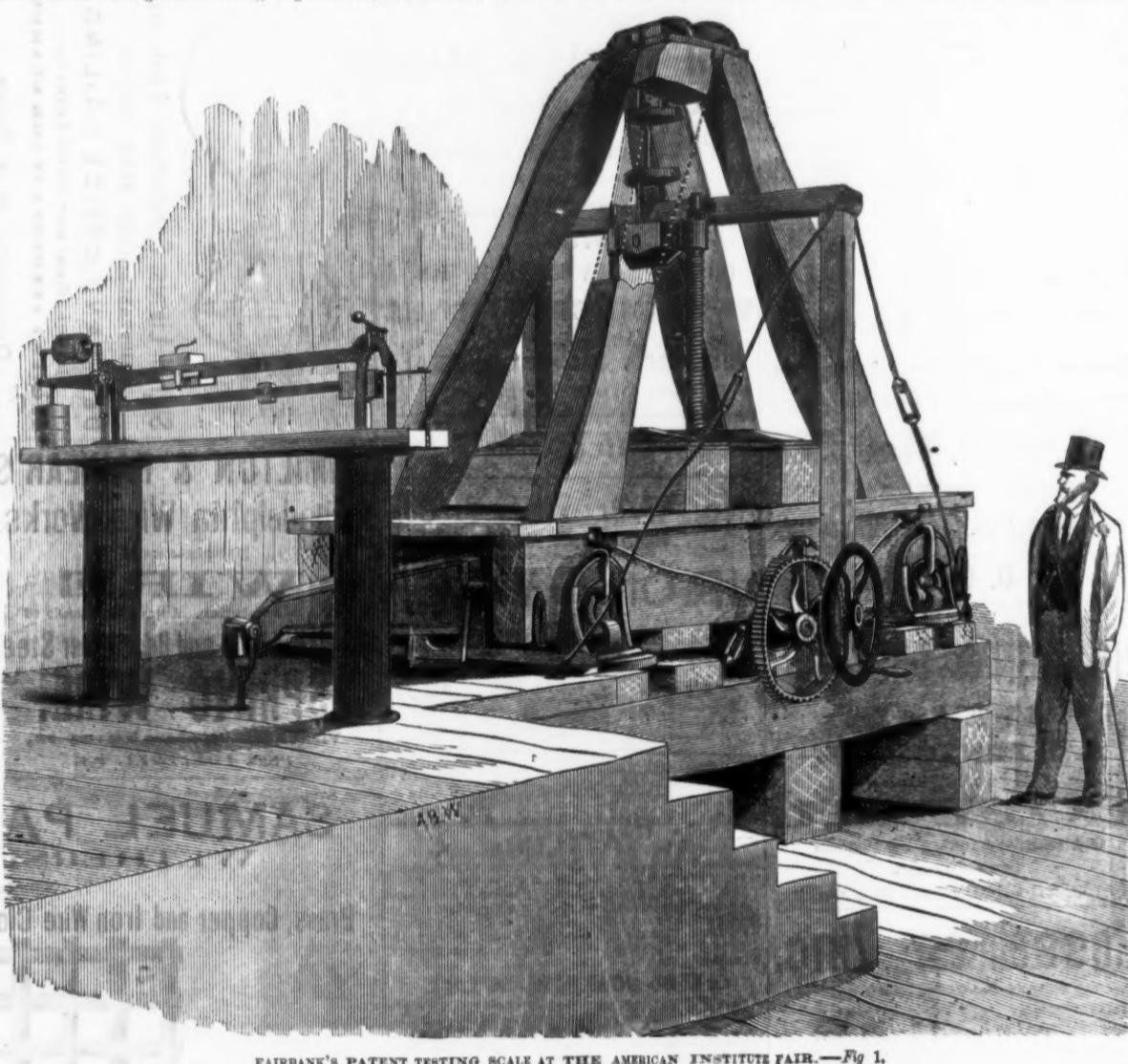
### The Patent Office at Washington.

A writer in *Lippincott's Magazine* thus idealizes the Nations' toy shop at Washington:

The Pompeian hall has something of the air of a hall dressed for legerdemain, and if you pause to think you will note a strange wizardry at work there. You linger before a little printing press, and as the magical clouds rise and shut out the work day world, the skies of Greece are overhead, and the Ancient, searching for his lever with which to move the world, passes down the room and lingers with you; for surely he has found the lever, and surely the world has been moved with it, the boundaries of empires broken up, kings disrowned, republics ruined. Go farther; a case of toys, harmless trifles enough, arrests you—cannon a finger long, batteries the size of a lady's spool stand, but the reduced models of death-dealing engines whose power of wholesale slaughter may one day revolutionize the codes of nations and abolish warfare; in another case you observe only a lump of coal, a phial of pitch, a flask of oil; and the necromancer of the place has dipped his rod down into the central darkness of the earth and drawn up light like the day's. Yet beyond, an iron stirrup and a slender spur, and the sewing girl has but to set her foot there and escape the shapes that dog her.

First—location—on tide water at the nearest point inland, where uniformly good harbors are afforded to the rich mineral deposits of Pennsylvania, with twelve miles of wharf fronts within the city limits.

Second.—Transportation facilities. A system of land and water transportation unexcelled on the Atlantic coast, with competing lines running in every possible direction. This system is now complete, and the various ores or kinds of iron used in manufacturing, whether on tide water or railroad, can as readily be centered here as at any other point in the country. We call especial attention to the word "competing," in the foregoing sentence, as the fact announced by that word is equal in importance to the announcement that any facilities at all exist. The experience and observation of many manufacturers have taught them that any enterprise, great or small, that puts itself in the power of any one transportation company, consents to its own injury, if not destruction. Monopolies are rarely liberal, and the possession of power is generally used to the advantage of the possessor, without due regard to the rights of others. Many firms and companies that have been induced by valuable gifts of land, and a contract for freights



FAIRBANKS' PATENT TESTING SCALE AT THE AMERICAN INSTITUTE FAIR.—Fig. 1.

put our producers on an equal footing with those of Great Britain. What will then happen is not a matter of doubt, as, at the same price, ship owners will undoubtedly prefer the superior iron of America in their ships. Our

modern improvements in labor saving machinery will, with materials at the same price, give our builders a decided advantage, immediately. It is generally believed by our ship builders that

the business needs no special legislation for its protection or advancement, although such legislation seems to be desired very earnestly by the proprietors of new yards, and builders in other places, who have not the advantages which experience alone can give. Whatever legislation will help to produce materials at low prices, and, above all, has the most valuable feature of permanency, is most to be desired. The ex-

perience for the past few years has demonstrated the improbability of securing any valuable assistance from legislation, and, in our judgment, the frequent change of the laws effecting these interests is more to be feared than desired, as it causes a constant feeling of insecurity, which prevents pushing the business with the vigor that is necessary to its success.

#### CARS AND CAR WHEELS.

What was said in the opening sentences of this report about the present condition of business in the country generally, applies with especial force to this important branch of our industry. This is not the time to judge of its progress, as it, of all others, is the sufferer by the recent panic in railway securities. No one, however, believes that this depression can last long. To believe that a business so directly connected with our national progress should long languish, would be to doubt the future growth and prosperity of our country. The great West is rapidly increasing in population

this cheaper and better than it can be done by the public corporations that own these roads, and, therefore, those having the greatest facilities and experience will always have enough to do to supply the demand, except when interfered with by these unnecessary panics, which, by a reckless disregard of known laws governing commercial transactions, are often precipitated upon us by the business gamblers, who

found in the market a field for their speculations.

It is evident that the iron manufacturers of the country are in a position to compete with those of Great Britain.

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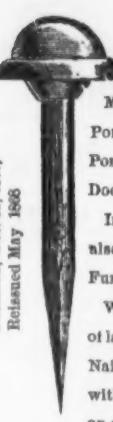
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October 15, 1873.

#### Awards at the Cincinnati Exposition.

From the official list of awards of premiums at the Cincinnati Industrial Exposition we select the following of interest to our readers:

*Steam Engines, Boilers, Steam Pumps, Steam Hammers, and all apparatus operated directly by Steam.*—Automatic cut-off stationary steam engine (this premium is given to promote the introduction of a class of steam engines calculated to reduce the consumption of fuel), gold medal, Wm. A. Harris; best safety steam boiler, silver medal, Crane, Breed & Co.; vertical boiler and engine combined, bronze medal, Whitmore & Brown; reversible steam engine for hoisting purposes, etc., bronze medal, H. J. Ready & Co.; steam pump, direct action, silver medal, Cope & Maxwell Manufacturing Co., Hamilton; steam pump, with crank and fly-wheel, bronze medal, J. H. McGowan & Co.; independent boiler feeder, bronze medal, Barney & Smith Manufacturing Co.; portable boiler, silver medal, Robinson Machine Works; portable farm engine, bronze medal, Robinson Machine Works; slide valve stationary engine, silver medal, Lane & Bodley.

*Steam Boiler and Engine Fittings, &c.*—Best low water indicator for steam boilers, silver medal, Hiram Kimball; best steam gauge, silver medal, Post & Co.; best safety valve for steam boilers, bronze medal, Aston Lock Safety Valve Company; best steam engine governor, silver medal, Gardner & Robertson; best combined heater and lime extractor for steam boilers, silver medal, Armstrong Heater Manufacturing Company; best Tallow lubricator for steam cylinders, bronze medal, F. Lunkenheimer; best piston packing, bronze medal, Wm. A. Harris; best grate bars for furnaces, bronze medal, L. B. Tupper.

*Turbine Water-Wheels and other Hydraulic Machinery.*—Best double acting lift and force pump for general purposes, silver medal, John H. McGowan & Co.; best cistern pump, bronze medal, John H. McGowan & Co.; best pump for general purposes, silver medal, John H. McGowan & Co.

*Machinists' Tools and General Metal Working Machinery.*—Best railroad car wheel and axle machinery, gold medal, Gaff, Gray & Gordon; best engine lathe, silver medal, Gaff, Gray & Gordon; best planing machine, bronze medal, Post & Co.; best upright drilling machine, bronze medal, Pratt & Whitney Co.; best radial drilling machine, silver medal, Gaff, Gray & Gordon; best shaping machine, silver medal, Gaff, Gray & Gordon; best bolt and screw cutter, silver medal, Stockwell, Griffin & Co.; best power shearing and punching machinery, silver medal, Long & Alstatter; best stove pipe elbow machine, silver medal, Resor Elbow Co.; best boiler flue expander, bronze medal, Post & Co.; best assortment of timbers' tools, silver medal, Charles Brombacher; best nail machine, silver medal, W. G. Robinson; best pipe screw cutting machine, silver medal, Stockwell, Griffin & Co.; best vise, silver medal, Stevens Patent Vise Company; best heading machine, silver medal, Plumb, Burdick & Barnard.

*Wood-working Machinery.*—Best band-saw for scroll work, silver medal, J. A. Fay & Co.; best reciprocating saw for scroll work, bronze medal, J. A. Fay & Co.; best variable stroke mortiser, silver medal, Lane & Bodley; best hub-mortising machine, bronze medal, Lane & Bodley; best lathe for irregular forms, silver medal, Lane & Bodley; best carving and frizing machine, silver medal, Battle Creek Machinery Company; best general wood-working machine, silver medal, Bentall Margedant & Co.; best molding machine (straight), silver medal, S. A. Woods Machine Co.; best dovetailing machine, silver medal, Battle Creek Machine Co.; best flooring machine, bronze medal, J. A. Fay & Co., best machine for dressing timber, silver medal, S. A. Woods Machine Co.; best sand papering machine, bronze medal, A. T. Nichols & Co.

*Edge Tools and Cutlery.*—Best assortment of door locks, silver medal, B. McGregor & Co.; wrought hinges, bronze medal, Wm. McKinney & Co.; wrought screws and bolts, bronze medal, L. M. Dayton; cabinet hardware, bronze medal, J. L. Wayne & Son; display of bronze hardware, silver medal, J. L. Wayne & Son; display of general hardware, silver medal, J. L. Wayne & Son; assortment of fire arms and hunting apparatus, silver medal, B. Kittridge & Co.; door plate engraving, bronze medal, J. R. Kinsey & Co.; fine metal screws, C. E. Roberts & Co.

*Building and General Hardware.*—Best assortment of door locks, silver medal, B. McGregor & Co.; wrought hinges, bronze medal, Wm. McKinney & Co.; wrought screws and bolts, bronze medal, L. M. Dayton; cabinet hardware, bronze medal, J. L. Wayne & Son; display of bronze hardware, silver medal, J. L. Wayne & Son; display of general hardware, silver medal, J. L. Wayne & Son; assortment of fire arms and hunting apparatus, silver medal, B. Kittridge & Co.; door plate engraving, bronze medal, J. R. Kinsey & Co.; fine metal screws, C. E. Roberts & Co.

*Edge Tools and Cutlery.*—Best assortment of table cutlery, gold medal, Landers, Frary & Clark; display of general cutlery, silver medal, J. L. Wayne & Son; assortment of edge tools, silver medal, J. L. Wayne & Son.

*Undertakers' Goods.*—Metallic burial caskets, silver medal, American Burial Case Co.; assortment of undertakers' hardware, silver medal, J. L. Wayne & Son.

*Plumbers' Goods, etc.*—Best assortment of plumbers' brass work, silver medal, Thos. Gibson & Co.; plumbers' supplies, silver medal, W. & J. B. Gibson; machinists' brass work, silver medal, J. H. McGowan & Co.; brass castings, silver medal, F. Lunkenheimer; plumbing work, silver medal, Thos. Gibson & Co.; lead pipe and sheet lead, silver medal, W. & J. B. Gibson.

*Tin, Galvanized Iron, Sheet Iron, Sheet Brass and Copper Work.*—Best copper work, bronze medal, Lallance & Grosjean Manufacturing Company; tin work, bronze medal, Iron-clad Can Company; zinc ornaments, National Zinc Ornament Company.

*Fire and Burglar Proof Safes, Bank and Safe Locks.*—Best fire and burglar proof safe, gold medal, Hall Lock and Safe Company; best fire proof safe, silver medal, Hall Lock and Safe Company; best burglar proof safe, silver medal, Hall Lock and Safe Company; best bank or safe lock, silver medal, Hall Lock and Safe Company.

*Refrigerators, Water Coolers, Freezers, Filters, and Miscellaneous House-furnishing Goods.*—Best refrigerator and water cooler combined, silver medal, Joseph W. Wayne; refrigerator, silver medal, Lorenzo Bender; water cooler, bronze medal, Cincinnati Tin and Japan Manufacturing Company; filter, bronze medal, D. W. Jamison; Japanese ware, silver medal, Cincinnati Tin and Japan Manufacturing Company; retinned stamped ware, silver medal, Lallance & Grosjean; planished tin ware, silver medal, Lallance & Grosjean; ice cream freezer, bronze medal, Charles Gooch; display of house-furnishing goods, silver medal, Sellew & Co.; enameled iron ware, silver medal, Hartj, Wiley & Co.; coffee-making apparatus, silver medal, John Van; improvement in cooking utensils, bronze medal, Eureka Co-operative Foundry Association.

*Hoisting Machinery.*—Best hydraulic hoisting machine, silver medal, Lane & Bodley; steam power hoisting machine, silver medal, H. J. Ready & Co.; hand hoisting machinery, bronze medal, National Derrick Co.

*Unclassified Machinery and Appliances.*—Best carbonic acid gas fire engine, silver medal, Babcock Manufacturing Company; best portable fire extinguisher, silver medal, Findlay Latta; best emery wheel machinery, bronze medal, Union Stone Co.; best pulley blocks, bronze medal, J. F. Hareourt; best power meat chopping machine, bronze medal, Murray Iron Works; best hand chopping machine, bronze medal, Murray Iron Works.

*Mowers, Reapers, Threshers, Seed Drills and Attachments.*—Best lawn mower, silver medal, Graham, Emlen & Pasmore; best grain drill, silver medal, P. P. Mast & Co.; best assortment of reaper and mower kylives, bronze medal, Akron Knife Co.; best grain drill, with guano attachment, silver medal, Thomas Ludlow & Rogers; thresher and separator, P. P. Mast & Co.

*Miscellaneous Agricultural Implements.*—Best walking cultivator, silver medal, Deere & Co.; riding cultivator, silver medal, Furst & Bradley Manufacturing Company; sulky hay rake, silver medal, H. Myers & Bro.; hay tedder, silver medal, Ames' Flow Company; corn planter, bronze medal, Springfield Manufacturing Company; clover huller, silver medal, Ashland Machine Company; potato digger, silver medal, Major Geo. W. Rue; harrow, silver medal, Furst & Bradley Manufacturing Company; power corn sheller, silver medal, J. Wilder & Co.; hand corn sheller, silver medal, J. Wilder & Co.; portable hay press, silver medal, J. Wilder & Co.; hay and straw cutter, silver medal, J. Wilder & Co.; hay fork, silver medal, H. A. Hinchee; horse hay fork, silver medal, A. J. Nellis & Co.; assortment of plows, silver

medal, J. Wilder & Co.; two-horse plow, bronze medal, Horey & Co.; horse power, silver medal, Robinson Machine Works.

*Ores and Metals.*—Best display iron ores, silver medal, Traber & Aubrey; silver ores, silver medal, F. Speth; pig iron, silver medal, Traber & Aubrey; coals, silver medal, J. M. Kearney & Co.

*Iron, Steel, &c.*—Best cast steel, Miller, Barr & Parkin, silver medal; best boiler iron, Burgess Steel and Iron Works, gold medal; best merchant bar iron, Gaylord Rolling Mill Company, silver medal; best hoop iron, J. F. Hazen, agent, silver medal; best assorted sheet iron, McCullough Iron Company, silver medal; best assortment of wire, Cleveland Rolling Mill Company, silver medal; best cut nails, W. G. Robinson, bronze medal; best wrought spikes, Gaylord Rolling Mill Company, bronze medal; best horse shoes (hand made), Wm. Russell & Co., bronze medal; best iron wire, Globe Rolling Mill Company, silver medal; best plow steel, Cincinnati Steel Works, silver medal.

*Saws, Scales and Bells.*—Premium 238, counter scales, Brandon Manufacturing Company, silver medal; premium 239, platform scales, Brandon Manufacturing Company, silver medal; premium 241, assortment of bells, Vandusen & Tift, bronze medal.

*Castings Iron, Work, &c.*—Best assortment of common iron castings, bronze medal, Brown, Knecht & Kempf; best assortment of malleable iron castings, bronze medal, Moline Malleable Iron Works; ornamental castings, silver medal, Brown, Knecht & Kempf.

*Railroad Supplies.*—Best general display, gold medal, Post & Co.; locomotive head light, silver medal, Post & Co.; spur work for domes, cylinder heads, &c., bronze medal, Post & Co.; frog, silver medal, D. C. Pearce; lamps for passenger cars, silver medal, Post & Co.; car springs, silver medal, Union Car Spring Manufacturing Company; freight car and switch padlocks, bronze medal, Post & Co.; door locks and latches for railroad cars, bronze medal, Post & Co.

*Cooking and Heating Stoves, Ranges, Furnaces, Steam Heaters and Ventilators.*—By request, no premiums are offered on stoves. Best stationary cooking range, silver medal, Barstow Stove Company; portable range, silver medal, Wm. Miller; range furniture, bronze medal, Fares & Fischer; stove furniture, bronze medal, Fares & Fischer; hot air furnace, silver medal, Crane, Breed & Co.; steam heating apparatus, silver medal, Crane, Breed & Co.

*Building and General Hardware.*—Best assortment of door locks, silver medal, B. McGregor & Co.; wrought hinges, bronze medal, Wm. McKinney & Co.; wrought screws and bolts, bronze medal, L. M. Dayton; cabinet hardware, bronze medal, J. L. Wayne & Son; display of bronze hardware, silver medal, J. L. Wayne & Son; display of bronze hardware, silver medal, J. L. Wayne & Son; display of general hardware, silver medal, J. L. Wayne & Son; assortment of fire arms and hunting apparatus, silver medal, B. Kittridge & Co.; door plate engraving, bronze medal, J. R. Kinsey & Co.; fine metal screws, C. E. Roberts & Co.

*Edge Tools and Cutlery.*—Best assortment of door locks, silver medal, B. McGregor & Co.; wrought hinges, bronze medal, Wm. McKinney & Co.; wrought screws and bolts, bronze medal, L. M. Dayton; cabinet hardware, bronze medal, J. L. Wayne & Son; display of bronze hardware, silver medal, J. L. Wayne & Son; display of general hardware, silver medal, J. L. Wayne & Son; assortment of fire arms and hunting apparatus, silver medal, B. Kittridge & Co.; door plate engraving, bronze medal, J. R. Kinsey & Co.; fine metal screws, C. E. Roberts & Co.

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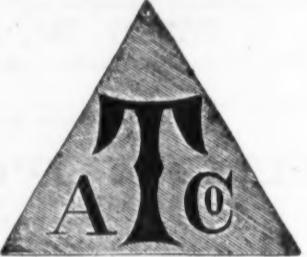
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## New Patents.

We take from the records of the patent office at Washington the following specifications of certain patents lately issued, which will be found interesting:

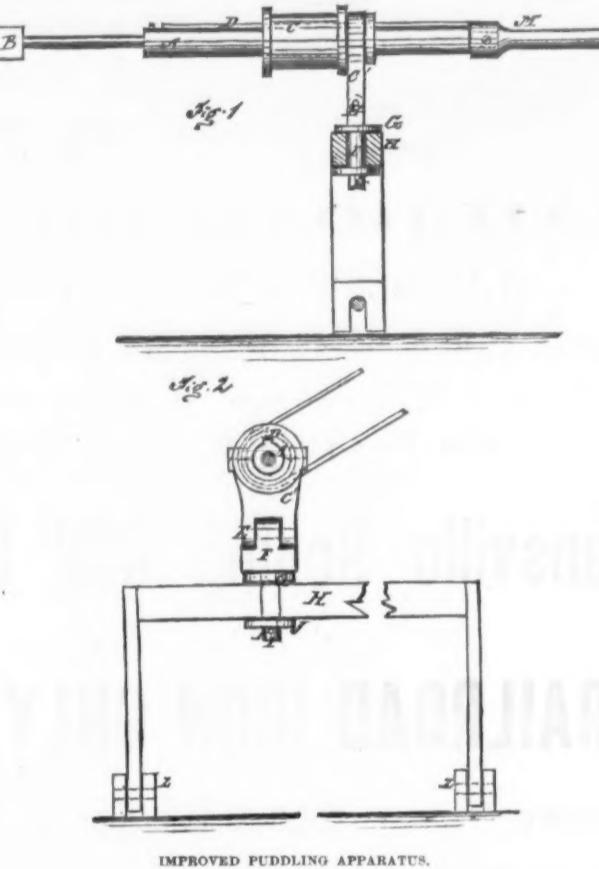
## IMPROVEMENT IN APPARATUS FOR PUDDLING IRON.

Specification forming part of Letters Patent No. 143,811, dated October 21, 1873, issued to Joseph Davies, of Knoxville, Tennessee.

Figure 1 is a side elevation of an improved puddling tool, and a section of the bench on which it is mounted. Fig. 2 is a section of the tool on the line x z of Fig. 1, and a side elevation of the bench.

Similar letters of reference indicate corresponding parts.

A represents the rod or shaft of the puddling tool, B, on which is a pulley, C, for revolving it.



more flux, and in this manner separate the impurities from the iron or steel. Use as a flux lime, flint, spar, or lean hematite or specular ore, or any other substance that will produce a liquid cinder free from impurities, the nature of the flux used depending somewhat upon the character of the ore or pig iron employed. Lean hematite or specular ore, when it can be obtained, is preferred.

If the ore or pig iron employed produces a thin liquid cinder, any substance that will produce a liquid cinder free from impurities—such as clay, lime, or lean hematite or specular ore—may be used; but if the ore or pig iron produces a thick gummy cinder that will not flow readily, some substance—such as lime, white sand, flint, spar, lean hematite or specular ore—must be used that will cut the thick cinder, and cause it to become liquid, so it can be drawn off.

The flux used should be made fine, about the size of coarse shot (may be a little finer or coarser), and should be separated from earthy matter.

When manufacturing iron or steel from the ore by the catalan forge fire, the operation should be conducted in the following manner,

viz.: When the blast is turned on at the commencement of the loop, one large or two small shovelfuls of flux should be put in the fire.

This will melt readily into cinder, and cover the bottom of the fire, and will mix with the impure cinder from the ore and cause it to become liquid, so it can be drawn off.

As soon as the loop is formed and settled to the bottom of the fire (which will vary somewhat, according to the condition of the fire, and will be from one-half to one hour), the cinder should be tapped and drawn off slowly until it is nearly all drawn off, care being taken to not draw it too close and leave the face of the loop dry. The handle portion, M, of the puddling tool rod or shaft is jointed to the other portion, so as not to revolve with it when held by the attendant for directing the tool.

It will be seen that the tool can be moved in and out by sliding in the pulley in which it is supported; also, by swinging the bench forward and backward on the pivots L, that it can be swung horizontally on the bench by turning the section F of the support, and that it can be shifted along the bench parallel with the furnace, and thus all necessary movements can be made to work the tool in all parts of the furnace to manipulate the iron for puddling and balling.

The principal object of the joint E is to keep the shaft or rod horizontal while swinging forward and backward on the pivots L.

Claim.—The puddling tool shaft D, pulley C, jointed revolving and sliding stand C F, and the handle portion M, of the puddling tool rod or shaft is jointed to the other portion, so as not to revolve with it when held by the attendant for directing the tool.

It will be seen that the tool can be moved in and out by sliding in the pulley in which it is supported; also, by swinging the bench forward and backward on the pivots L, that it can be swung horizontally on the bench by turning the section F of the support, and that it can be shifted along the bench parallel with the furnace, and thus all necessary movements can be made to work the tool in all parts of the furnace to manipulate the iron for puddling and balling.

The principal object of the joint E is to keep the shaft or rod horizontal while swinging forward and backward on the pivots L.

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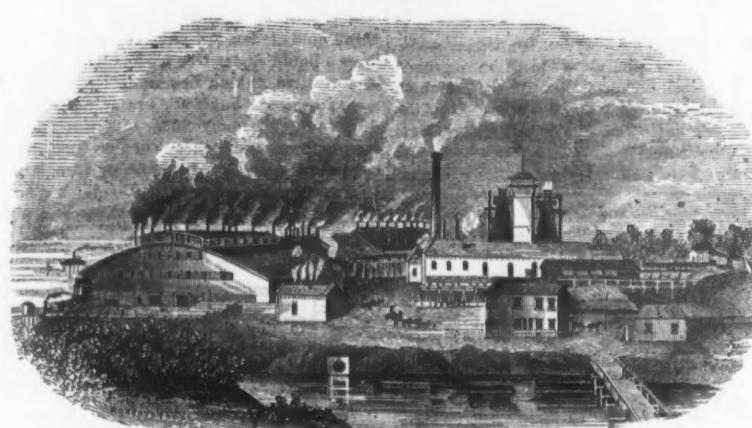


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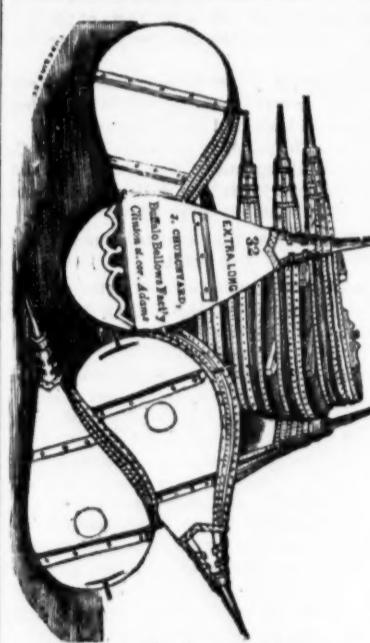
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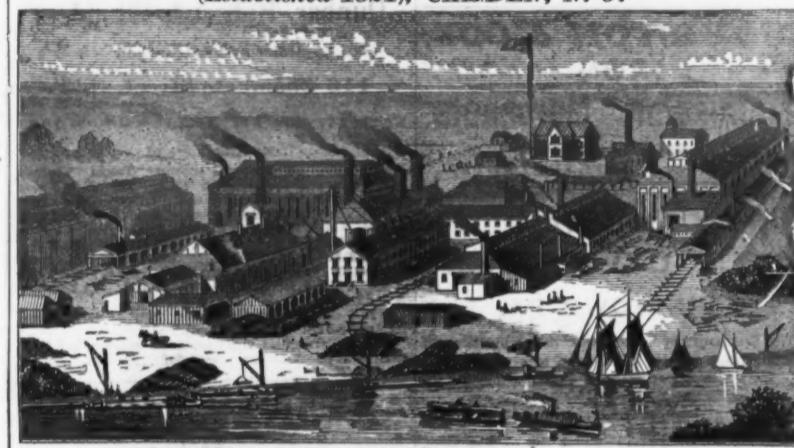
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## Foreign Mining and Metallurgy.

The London *Mining Journal* presents the following interesting summary of the state of the mining and metallurgical industries of the Continent:

There are great hopes of a revival in the French iron trade, but at present the state of affairs is not very brilliant. Prices have not varied. There is still, of course, some demand for iron, but this demand has greatly declined. It is difficult to imagine how a temporary slackening of activity in industrial affairs could have involved the extinction of so many blast furnaces and the stopping of so many rolling mills. There have been few small transactions in casting pig, but there has been scarcely anything passing in refining pig. Quotations range between £4. 8/ and £4. 12/ per ton in the Haute-Marne, and £4 and £4. 8/ per ton in the Meurthe-et-Moselle, but prices do not appear to be very well established. Merchants' iron has been almost as much neglected as pig; quotations range between £10. 8/ and £11. 4/ per ton. At Paris first-class merchants' iron has been dealt in at £11. 12/ per ton. Rails and plates have occupied a more favorable position upon the French markets. This is especially the case with rails, thanks to some rather important contracts concluded at the commencement of the season. A contract for 300 tons of large plates has been concluded at £16 per ton, at the works. Machine iron has been well maintained. No. 20, coke made, has been dealt in between £12. 8/ and £13 per ton. In the basin of the Loire the iron market appears tolerably active. Upon the whole, there is not much alarm in the French iron trade; it is depressed undoubtedly at present, but confident hopes are entertained of a revival in affairs. The Liverdun Forges Company will pay, Jan. 15, a dividend for the first half of 1873, at the rate of 12 per share. The Fives-Lille Company has announced a dividend for 1872-3, at the rate of £3. 8/ per share; of this dividend £1. 4/ per share was paid in coin Nov. 3, and 14/ per share will be distributed in coin May 1. The balance of £1. 10/ per share will be paid in obligations of the company, bearing interest from Jan. 1, 1874. The Bethune Mines Company will pay to-day (Saturday) dividend of £1 per share.

There has been a notable slackening in the French coal trade; stocks are being formed at the pits' mouths, and in the warehouses of merchants. Coal owners also display a desire to sell, and are making, with that object, some concessions in regard to prices. This is not what the coal trade had hoped for and expected. Some surprise is felt at this sudden check in affairs at a usually favorable season, and all the more alarm is felt since it is thought that the present situation rests on a weak foundation. In the basin of the Nord, and especially at Lille, coal is stated to have been offered by one mine at 2/6 per ton below the official quotation. Paris, which usually reflects tolerably well the state of affairs, exhibits now a rather serious depression in coal—at least among speculators. Stocks are stated to be accumulating, and deliveries are small, as well by railway as by water. It is not surprising, perhaps, that the market, which has been undecided for two months past, should still maintain its indecision; producers will, probably, make a final effort when they are seconded by the rigors of the season, but a reduction in rates is inevitable. In the basin of the Loire the demand is active, and prices are hardening, while stocks are almost nil. This condition of things is, however, restricted to the comparatively narrow limits of the Loire basin. The hope is gaining ground, taking France generally, that the price of coal is returning to a normal level in that country.

There does not appear to be any serious change in the aspect of the Belgian iron trade, and it is difficult to see how metallurgical industry can revive with a continuance of the causes which have brought it to its present condition. It is not sufficient that the falling price of coke leaves a little more latitude to the pig iron market. It is necessary that the conversion of pig into iron should be attended with some profit, and that iron should be restored to all its former ordinary applications by selling again at more moderate prices. It is necessary, also, that a fall in iron should coincide with a fall in coal, as there are few industries consuming one material which do not consume the other. Refining pig meets a slow sale, at £4 to £4. 8/ per ton; casting pig remains rather neglected, at £5. 12/ to £6 per ton. Merchants' iron maintains its price, but there is comparatively little business passing in it. Rails have been the subject of some transactions, and the special rolling mills do not much want work. The plate mills have also some orders, but they would not suffice to employ this branch of the national industry if a number of works were not reduced to a state of idleness. The importations of pig and iron into Belgium have increased to the extent of 25 per cent. during the first eight months of this year, having risen from 100,000 tons to 125,000 tons. The whole of the increase observable in this year's figures occurred in the imports from England. The imports of August presented a diminution, as compared with those of 1872. The expansion observable in the imports from Great Britain occurred in rough pig and rails. On the other hand, the exports of iron from Belgium declined from 192,000 tons in the first eight months of 1872 to 163,000 tons in the first eight months of 1873; the decline in the exports occurred especially to England and the Low Countries. In August, Belgium only exported 16,000 tons of iron of various descriptions, against 25,000 in August, 1872.

Coal quotations have not varied in Belgium, but the demand has become less active; such may be said to the budget of the week. Stocks are beginning to accumulate, deliveries are less numerous, and railway rolling stock no longer makes default. The temporary dullness in the

trade is attributed to the uncertainty in political events in France and the continuance of comparatively fine weather. Supplies were also laid in with some activity during the summer and autumn, and this circumstance has of course had a tendency to increase the existing dullness. At Charleroi the coal trade is beginning to complain of a scarcity of orders; prices remain, however, apparently firm. At Mons industrial coal has been feeble; only coal for domestic purposes is purchased with any firmness; prices have remained without any variation. At Liege there has been the same state of affairs and the same tendency in business. Everywhere the coal trade presents, however, some heaviness. The imports of coal into Belgium amounted in the first eight months of this year to 404,000 tons, as compared with 126,000 tons in the corresponding period of 1872. August figured in the two totals for 57,000 tons and 15,000 tons, respectively. The increase in the imports has referred wholly to coal obtained from the Zollverein, 224,000 tons more Ruhr coal having been imported into Belgium in the first eight months of this year than in the corresponding period of 1872. The imports of English coal into Belgium increased to the extent of 38,000 tons in the first eight months of this year, and those of French coal increased to the extent of 1400 tons. The imports of coke into Belgium also increased in the first eight months of this year to 20,700 tons, as compared with 4500 tons in the corresponding period of 1872. The exports of coal from Belgium declined from 3,000,000 tons in the first eight months of 1872 to 2,800,000 tons in the first eight months of 1873. The exports of Belgian coal to the Low Countries also presented a falling off of 135,000 tons to August 31 this year. The exports of Belgian coal in August amounted to 345,000 tons, as compared with 401,000 tons in August, 1872. On the other hand, the exports of coke from Belgium have increased this year, having amounted to 585,000 tons to August 31, as compared with 510,000 tons in the corresponding period of 1872. These statistics seem to show that Belgium has largely suffered as regards its foreign coal connection from the excessively high prices which have prevailed for coal in Belgium.

## The Sutcliff Gun.

On the afternoon of Monday, the 3d instant, the new Sutcliff gun, weighing in its rough state 72,000 pounds, was successfully cast at the West Point Foundry, and being the most gigantic piece of ordnance ever cast here has created considerable interest.

At its last session, Congress made an appropriation for the purpose of assisting American inventors in their experiments on heavy artillery. Mr. Sutcliff, whose name the gun bears, is one of the few gentlemen whose plans are being tested by the government. He is only interested in the steel mechanism which is to be attached to this "preacher that speaks to the purpose," as Miles Standish would call him.

The gun is made of the finest iron (standing a pull of 30,000 to 35,000 pounds), and brought here by Messrs. Paulding, Kemble & Co. for this express purpose. The casting is now 19 feet long, but when finished will be only 15. It will then have a steel barrel 4 inches thick at the breach and 3 at the muzzle, with rifle bore, and weigh 45,000 pounds. The ball will be 9 inches in diameter, and weigh about 250 pounds.

The mold was made a week ago, and at the time of casting was as hard as a sun dried brick. It was so situated that the iron from two large furnaces could be run directly into it by means of troughs. The core is a cast iron tube, wound with rope and covered with sand. This was filled with water the moment the metal was run in the mold. Twelve and a half minutes were occupied in casting, and the water, which was being forced through the core at the rate of 25 gallons per minute, was raised from 38 to 51 deg. The core will be kept full of water 12 hours, when the iron will be sufficiently set to allow its removal. The water will then be exhausted, and as soon as the rope burns from its outside, tackling will be attached and the core withdrawn. Then Rodman's celebrated process will be kept up for six days. The bore being always full of water, of course the contraction from the inside goes on more rapidly than from without, and the desired strength is thus obtained. The portion next the water is first contracted by cooling; the part next cooled, contracts, and binds the first, as it were, like a band on the inside. The next layer acts similarly, and so on till all is cooled, each part successively binding that within till all is held with great tenacity. Eight days will be required to cool this monster, and at a cost of about \$15,000.

**American Steel.**—A correspondent of the *Chicago Times*, who evidently believes in American steel, says: "In my travels throughout the country, I am repeatedly asked, why not make as good steel in this country as in England? I admit that such a question might have been pertinent ten or twelve years ago. The steel trade of this country was then in its infancy, inexperienced had to battle against a country of a century's growth in the trade, and we may add that there has been improvement in English steel for more than a half a century, while in America the short space of fifteen years has raised her to a standard of success surpassed by none in the world. We assert, and that fearlessly, that America cannot at present be surpassed in her manufacture of steel. Why should she? Her artisans are as intelligent as any on the globe, quick to see and ready to act, in fact the personification of true business, while her process is the same as in England, and the stock used equally as good. To raise the country to an equal popularity with Sheffield only requires the destruction of a needless and unwarranted prejudice, which is happily fast dwindling away. I have had twenty-five years' experience in the steel trade in Sheffield and in this country, and know whereof I speak, and I predict that ere long English steel will be unknown in American markets. Let us encourage, then, the industries and support the production of home, and thereby give our mechanics a fair chance in the great battle of life, and the result will be the envy of surrounding nations and the astonishment of a gazing world."

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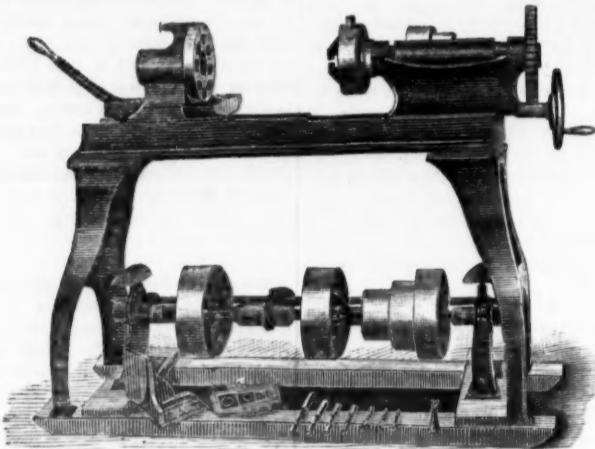
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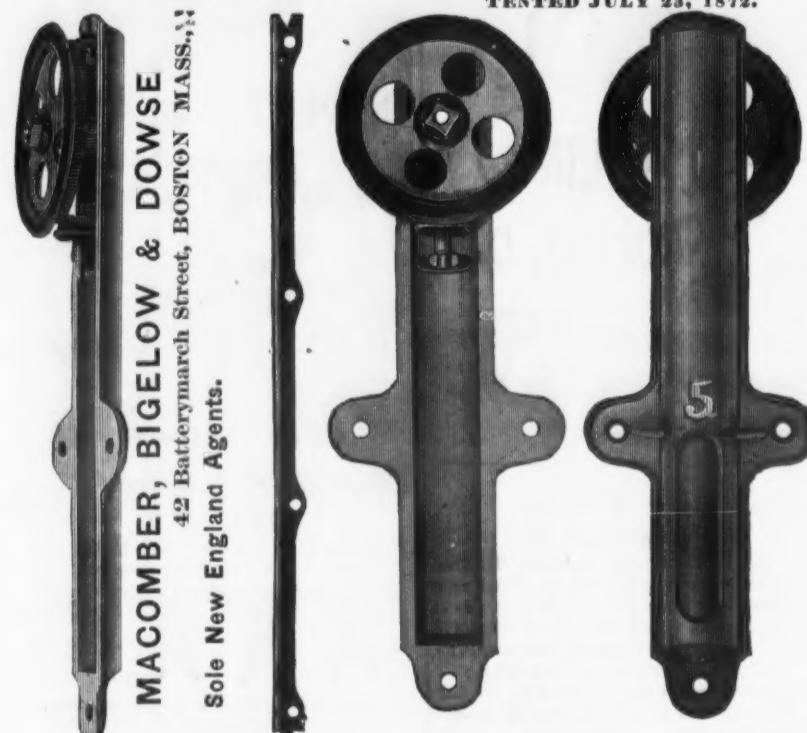
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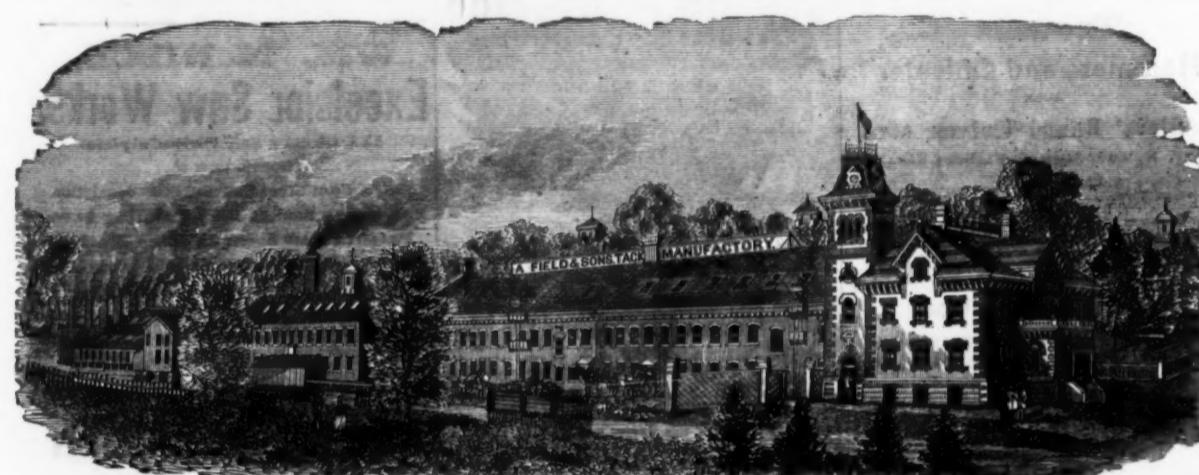
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## Bundy's Patent Radiator.

We present herewith illustrations of Bundy's Patent Radiator, a steam heating apparatus invented recently by Mr. N. H. Bundy, and introduced by the Charles Gregg Manufacturing Company, of this city. It offers some special features in construction which, alike from their novelty and manifest usefulness, are worthy of notice.

The radiator consists of vertical tubes, cast entire, with a web or division forming two separate passages, which communicate at the top, and render each tube complete in itself. By this peculiar formation it differs from other steam heating apparatus, inasmuch as the necessity for introducing independent diaphragms, tubes or other devices is obviated, and the consequent liability to disarrangement of the parts is avoided. The tendency of the ordinary radiators to get out of order has been a fruitful source of annoyance to those using them, and it is claimed for Mr. Bundy's invention, on apparently good grounds, that in it the principal causes which operated in producing the disarrangements complained of have been avoided. The particular form in which the tubes are cast secures a complete circulation of steam, while it seems to reduce the chances of any irregularity or disorder in the working of the apparatus to a minimum.

Another peculiarity of the construction, as may be seen from the engraving, is the large amount of radiating surface presented by each tube, on account of its particular shape; an amount estimated at three

superficial feet, and equal to that of three pipes of the ordinary wrought iron pattern, while occupying only about one-third of the space required by the latter. This renders the patent radiator especially desirable where economy of space is a consideration, and is of itself an important element in enabling us to estimate at its proper worth this valuable invention.

The radiator possesses in a high degree the elements of safety, durability and economy, and has taken a favorable place in the estimation of those who have tested its merits by experience, as well as of those experts who are best qualified to judge of the advantages it presents. Its place in the opinion of the trade may be indicated by the fact that the manufacturers report themselves as being behind their orders.

## BUSINESS ITEMS.

## PENNSYLVANIA.

The Atlas Foundry has an order from the Tredegar Iron Works, of England, for a supply of the Peartie pit car wheels. These wheels are in use in many of the mines of Western Pennsylvania and Eastern Ohio. Notwithstanding the financial stringency, these works are full of orders.

Messrs. Tate, Alston & Sterritt, Pittsburgh, have commenced the manufacture of a solid cast steel wagon skein of a new pattern. They are made for light or heavy work, and are said to be much superior to any other make. The solid shoulder being cast on the skein and immovable, is considered a valuable improvement over the movable ring.

The name of "Mt. Pleasant" Furnace, located at Lundin, Franklin county, has been changed to "Richmond," and it is now owned by the Southern Pennsylvania Railroad and Iron Company.

Mr. James Westerman, a leading manufacturer of Sharon, has perfected his patent smoke consuming appliance to boiling furnaces, and the result is said to be more gratifying than he anticipated. By actual computation he finds that it saves 300 pounds of fuel per day to a furnace. As the Westerman Iron Co. are now applying the improvement to all their furnaces, twenty-nine in number, the saving in coal will amount to forty-three and a half tons per day. The improvement does not materially increase the expense of building the furnace.

The extensive iron works of the Messrs. Weimer, at Lebanon, will shortly be put in full operation again.

## MASSACHUSETTS.

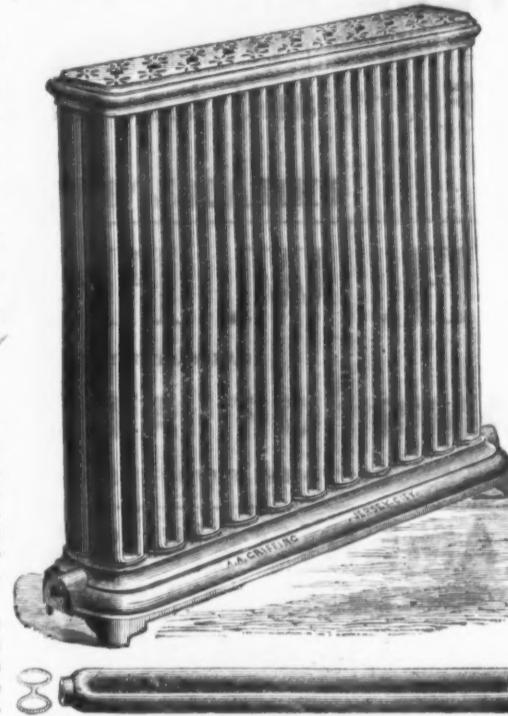
The Richmond Iron Company, at Great Barrington, are extending rather than curtailing business, and have just increased their mining operations at the Cheever mines by putting up two additional engines, one for washing their ore and the other for mining. They shipped from the mine, by railroad, in October, 745 tons, in addition to the amount taken to the home furnace.

The Ames Plow Company, of Worcester, has orders on hand which cannot be filled, unless the working force is increased, until the middle of January.

The U. S. Cartridge Company, at Boston, will run their works day and night, employing two sets of men for the purpose. Beside orders for several millions of cartridges from the War and Navy Departments, they have large orders for "commercial work."

The Boston Advertiser states that the Hinkley Locomotive Works have reduced their hands from 575 to 250, and the pay 20 per cent. The discharge has been gradual. None of the men make any complaints, but speak in the highest terms of the officers and heads of departments, and it is the general opinion among them that they had rather be in the employ of this than any other company. The reduction of the

force was made necessary by the cancellation of the contract with the Chicago and Canada Southern Railroad Co. for 30 locomotives. Seven more are completed for the Montpelier and Wells River Railroad, and will be sent as soon as the railroad recovers from its embarrassment. They now have orders to keep the works running for a month, and the promise of an order from N. Y. which it will take the whole force to fill. But should they receive no orders, they will still furnish employment for the present force the entire winter in the re-



BUNDY'S PATENT RADIATOR.

pair shop, which (\$15,000 a month) will not be affected. It is the opinion of locomotive manufacturers, however, that the established roads and main lines, all being short of power, will embrace this opportunity to increase their rolling stock, and that business will soon be brisk, though at reduced rates and profits.

The Atlantic Works, of East Boston, have received a government contract for revenue cutter machinery, amounting to \$600,000. The contract was first offered the Woodruff Iron Works, of Hartford Conn., but was declined.

The Chapman Machine Works, at Turner's Falls, are running on full time, and report a good demand for their products.

The Clinton Wire Cloth Company make more than 300 different varieties of wire cloth, netting and fencing, including almost everything which can be mentioned in their lines. They employ, in busy seasons, 200 hands, including the machineists who make their machinery.

The Rollstone Machine Co., of Fitchburg, are running on full time, with a full force of hands, and intend to continue doing so during the winter, having large advance orders.

The Wason Car Company, of Springfield, shipped recently ten of the Texas & Atlantic line refrigerator cars—the first shipment of an order of fifty cars. The ice box in these cars is on the top, and is about 15 inches high, 4 feet wide, and extends the whole length of the car; it will hold about a ton of ice. Inside the car there are racks for hanging meat and shelves for holding small articles. The sides of the car are built after the regular refrigerator pattern.

Haskins Machine Co., of Fitchburg, are running on full time, and have orders ahead for several engines.

The Plymouth Iron Foundry is now running upon large orders from California.

The American Corrugated Iron Co., of Springfield, are very busy, and over-run with orders for its special line of goods.

## CONNECTICUT.

Mallory, Wheeler & Co.'s lock shop, at New Haven, have begun work with an increased force of hands. The foundry has started up with the rest.

The Lime Rock Iron Company has, during the past few months, been building entire new blowing works across the stream from its blast furnace, to take the place of the old dilapidated works further up the stream, which have done service for the last twenty-five years. The new works are considered among the finest in that section of the country.

Business is brisk at the Coe Brass Foundry, in Wolcottville, but most of the work is on foreign orders. The company have an order from Russia for cartridge metal which will keep them busy for several months. They ship a thousand pounds of rolled brass to a firm in Massachusetts, to be cut into cyclets.

## OHIO.

A steam gong, consisting of three 15-inch steam whistles, has been erected at the Sandusky Steel Works, and, when blown, it is said, can be heard fifteen miles away.

The Buckeye Engine Company, of Salem, has been in operation 22 years, and manufactures steam engines for all purposes, from 1½ up to 200 horse-power, as well as circular saw mills, shingle machines and general mill gearing. The paid up capital is \$250,000. The officers are Joel Sharp, president; Walter Davis, vice-president; J. S. Bonsall, superintendent; Simon Sharp, assistant superintendent; Thos. C. Boone, secretary and treasurer. Four buildings, covering two acres, are used, two of these brick and two frame, and all two stories high. The monthly pay roll to 125 hands is \$6500, and over 2000 tons of iron, beside other material, is used annually. The sales in 1872 amounted to \$256,950.

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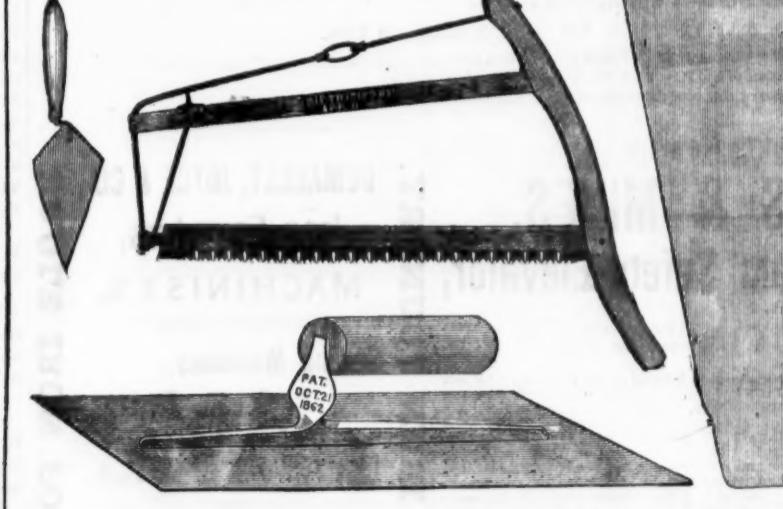
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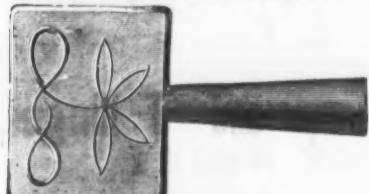
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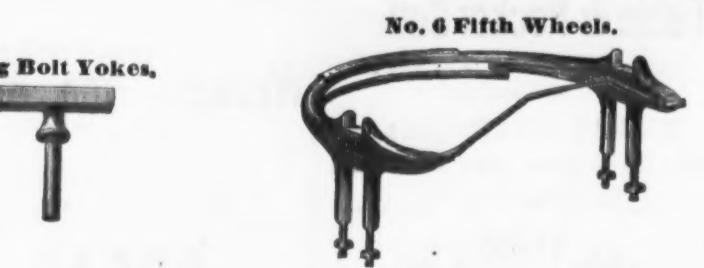


Leaf Pattern.



Established 1850.

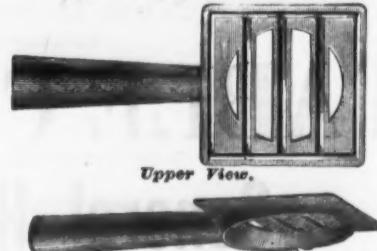
No. 6 Fifth Wheels.



1871 Pattern Shaft Couplings.



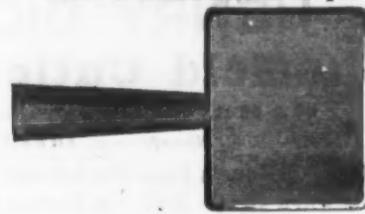
Patent Cross Bar Steps.



Upper View.

Lower View.

Solid Plain Pattern Steps.



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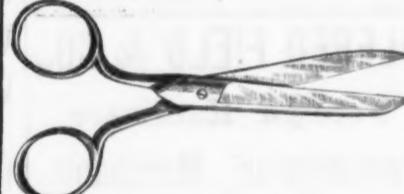
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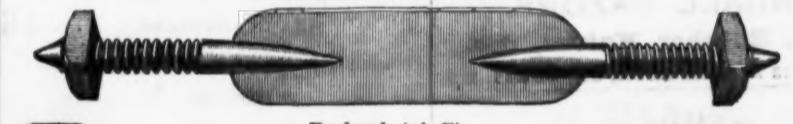
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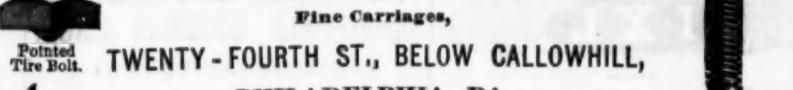
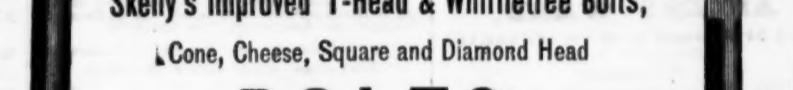
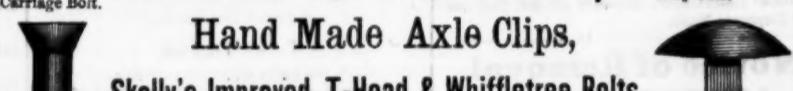
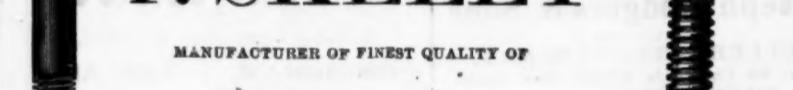
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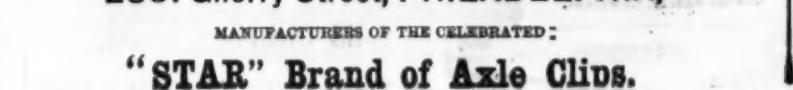


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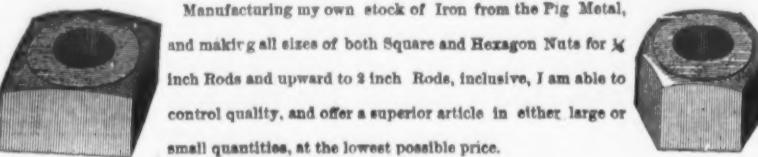
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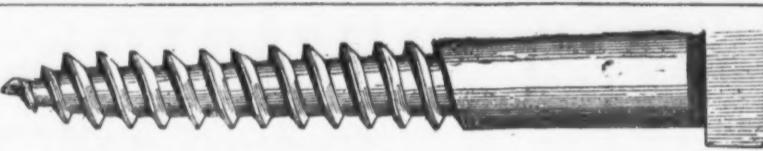
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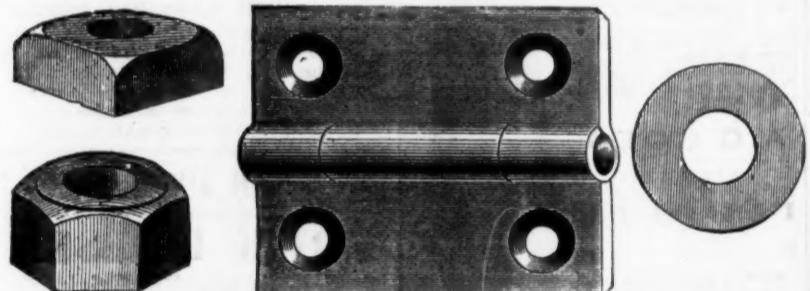
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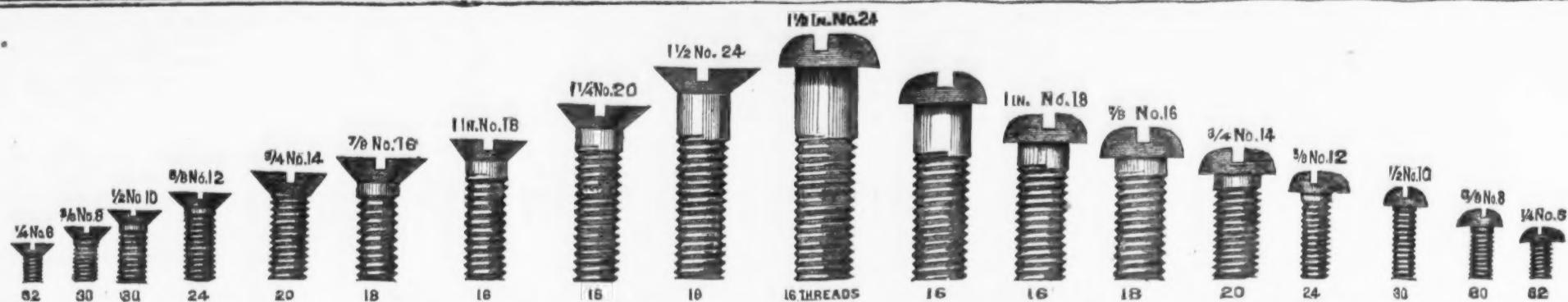
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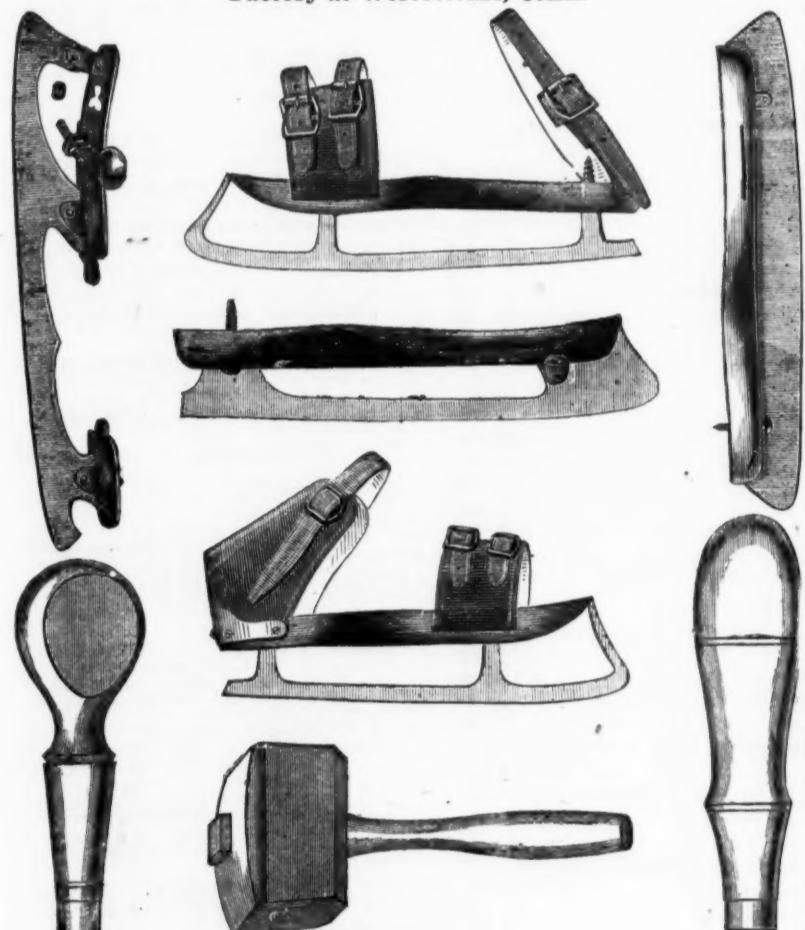
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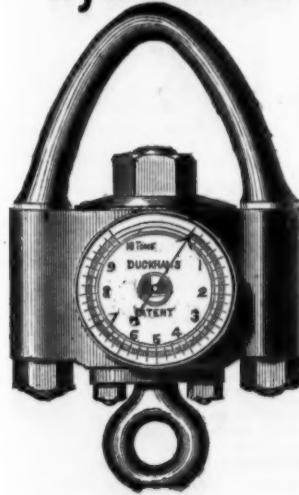
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City Subscribers will confer a favor upon the Publisher, by reporting at this office any delinquency on the part of carriers in delivering *The Iron Age*; also, the loss of any papers for which the carriers are responsible. Our carriers are instructed to deliver papers only to persons authorized to receive them, and not to throw them in hallways or upon stairs; and it is our desire and intention to enforce this rule in every instance.

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Shall We Have Free Trade in Ships.

As most of our readers will doubtless remember, the National Board of Trade, at its last convention, passed a resolution favoring the abolition of the tonnage registry law and the admission of foreign ships, under a "reasonable" impost duty, to the American carrying trade. This resolution was justly rebuked by the American Iron and Steel Association in a resolution which will be found in the account of the recent meeting of that body in our issue of the 26th ult. The difference of opinion thus expressed has led to an interesting correspondence between Mr. Geo. L. Buzby, Secretary of the Philadelphia Board of Trade, and Mr. Samuel J. Reeves, President of the Iron and Steel Association, which has been given to the public in the *Bulletin* of that association, and which is of so much interest to our readers and the public at large that we give it space in our columns.

OFFICE OF THE BOARD OF TRADE.  
PHILADELPHIA, NOV. 22, 1873.  
Samuel J. Reeves, Esq., President American Iron and Steel Association, Philadelphia: DEAR SIR—Will you permit me respectfully to submit the text of the resolution, passed by the National Board of Trade at its late session in Chicago, on "American Shipping Interests." It reads thus:

"Resolved, That justice to the ship-owning interest and the best welfare of the National commerce alike

demands that the right be conceded by law to American citizens to purchase tonnage, wherever built or owned, and to place it under the protection of their own flag, upon the payment of a reasonable duty upon the same."

In reading the newspaper remarks of your address before the Iron and Steel Association on 20th Inst., the above resolution is referred to, but no mention is made of the saving clause recited above in Italics. I am aware that speeches are often inaccurately reported, and that you may have alluded to this feature of the resolution. As a delegate to the National Board of Trade, I assure you there was a keen and spirited discussion, and that gentlemen from your open ports, and from the law, to secure the clause exempting payment of duties on foreign built ships, as upon other imported merchandise. This was the best that could be done, and all that could be done. It was a long step in advance of anything that at previous sessions could be obtained from the Board.

Trusting you will excuse the liberty I have taken, I have the honor to be, very respectfully yours,

GEORGE L. BUZBY, Secy.

OFFICE OF THE  
AMERICAN IRON AND STEEL ASSOCIATION,  
PHILADELPHIA, NOV. 24, 1873.

George L. Buzby, Esq., Secretary Board of Trade, Philadelphia: DEAR SIR—I beg to acknowledge receipt of your letter of the 22d Inst., in which you call my attention to some remarks made by me at the annual meeting of this Association on the 20th Inst., relative to the resolution adopted at a meeting of the National Board of Trade last session in Chicago, reciting that "the right be conceded by law to American citizens to purchase tonnage, wherever built or owned, and to place it under the protection of their own flag, upon the payment of a reasonable duty upon the cost."

Until I read your letter I was not aware that the resolution as adopted was modified from the original proposition of the Free-Trade section of the Convention, so as to make the antislave and virus go forth together.

Nevertheless, it is evident, from what you state in your letter, that the amendment requiring foreign built vessels to pay duties as upon other imported merchandise was one of defense only, and "the best and all that could be done" in the way of opposition to the measure. Those who were instrumental in attaching the duty clause to the resolution deserve commendation from the advocates of American Industry. But iron shipbuilding in this country is at this time established on a firm basis, and is contending for a place among the great nations of the world.

Under such circumstances the members of our Association are solidly opposed to any legislative interference in the onward march of this new development of American enterprise.

Only a short time ago it was alleged by these same Free Traders that iron ships could not be built in this country because of the dearth of iron, and they were persistent in their efforts to have the duty removed on imported iron used in the construction of ships. That argument has gone to the wall; and now American iron, admitted better in quality, is also cheaper than the imported. Ships are now being built on the Delaware River and elsewhere as cheaply as on the Clyde, without the use of a pound of foreign iron. Those already afloat have proved themselves equal to any built abroad in the staunchness of their construction and in their sailing qualities.

These facts being patent to members of our Association, they felt it their duty to protest that it is not true "that justice to the ship-owning interest and the best welfare of the national commerce alike demand that the right be conceded by law to American citizens to purchase tonnage wherever built or owned, and to place it under the protection of their own flag." From the beginning of our national government to the present time our policy has been exactly the reverse of this declaration, and we trust that policy will not be altered just at the time when American ingenuity and enterprise have made it necessary to do so. The flag of our country will float more proudly over ships built out of American material and owned by American citizens, than from the mast heads of those launched in the Clyde.

In the expression of these views I feel quite sure that you will agree with me. Thanking you for calling my attention to the saving clause appended to an objectionable resolution passed by the National Board of Trade, I am, very respectfully yours,

SAMUEL J. REEVES, Pres't.

This correspondence is of especial interest, for two reasons—it shows the true character of the National Board of Trade on the one hand, and presents on the other a strong and unanswerable argument against any injudicious modification of our registry law. A body in which the friends of protection have to make a strong fight to secure the appendage of a saving clause to a resolution designed to be a square declaration in favor of free trade, is not a body whose opinions on matters connected with the industrial development of the country are entitled to favorable consideration among the firm supporters of the tariff. At all events, the National Board of Trade will bear watching, and we hope the local boards will keep this in mind in choosing delegates to it, especially when its utterance are likely to be seized upon as texts for free trade sermons and suggestions for free trade bills in Congress.

But while the friends of protection doubtless did the best they could to modify the resolution which they were unable to defeat, we quite agree with Mr. Reeves that the "saving clause" to which Mr. Buzby calls attention does not make the resolution acceptable. We do not want British built ships at any price or upon any terms. We can build them cheaper and better at home, and there is no such urgent demand for the increase of our merchant navy as to necessitate the repeal of our registry laws, especially at a time when the ship building industries of the Atlantic seaboard are experiencing so rapid and healthy a development. Mr. Secretary Richardson reports, on the authority of exact data furnished by Dr. Edward Young, that "official numbers were awarded by the Bureau of Statistics to 1690 vessels of the aggregate tonnage of 313,743 tons, while during the year preceding, the addition to our mercantile marine was only 38,621 tons. From the 1st of July to the 1st of November, 1873, documents have been issued to 1288 completed vessels, of 181,000 tons in all, while such returns as have been received, incomplete as they are, indicate that there were building in October last 386 vessels of the tonnage of 177,529 tons, including 69 steamers with a tonnage of 67,007 tons, of which 18 iron steamers, with an aggregate of 38,492 tons, are in course of construction on the Delaware."

Such an expansion of our shipbuilding industries would not have been possible had foreign bottoms been admitted to an American registry during the past year, and we cannot do better than to protect this industry in every possible way.

The probable effect of the repeal, or essential modification, of our registry laws would, perhaps, be a considerable increase in the number of ships carrying our flag; but were we to get this increase tonnage, what would we have? Great Britain has attained her position as a builder of iron ships by sacrificing everything to cheapness, and we have eminent British authority for saying that the quality of vessels built in British yards is steadily degenerating as the cost of materials and labor increases.

The plates used by English and Scotch builders possess an average resisting strength of 20,000 lbs. to the square inch—in this country iron would be considered wholly unfit for use which would not develop a strength of from 40,000 to 60,000 lbs. We do not say this has always been so, for when ships were first built of iron the quality of metal employed was considered as of more importance than economy in the cost of materials employed. But it was soon discovered that a saving could be effected by using iron fit for no other purpose. Describing the means employed to reduce the cost of British tonnage, our able London contemporary, *Iron*, says with commendable candor:

Plates through which a foot clad in a stout boot might be kicked with ease, were considered good enough to stand between man and eternity. Metal so rotten that it broke in pieces when carelessly dropped on a hard surface, was employed in the construction of vessels destined to be manned by Englishmen—men, however, the fathers of all civilization—but the single one of economy was sacrificed by the unscrupulous few to whom the lives of their fellow men weighed but little against a heavy balance at their bankers. This fertile cause of disaster was doubly dangerous on account of its treachery. Ships fulfilled the requirements of surveyors, and were classed according to their outward appearance, while their real rottenness remained concealed. Hence a dire catalogue of catastrophes, one of which at least, has secured a dark page in history.

But we have other and even stronger condemnation of cheap British iron ships, from men whose position and character render it impossible for them to misrepresent a subject they venture to discuss in public. In our issue of May 1st we published a portion of the address of Mr. Rundell before the Institution of Naval Architects, which makes such startling statements that we cannot resist the temptation to reproduce them at this time. Mr. Rundell said:

If I am informed rightly, the iron at present used by shipbuilders is really getting by degrees worse and worse. Why it is I do not know, and it would not be fair, perhaps, to ask a shipbuilder any question on that subject, because it is one which he is only interested in as a secondary manner. It has been my fortune for many years to see not only new ships which have been built, but wrecked vessels, and I have seen some wrecked iron vessels that you would fancy were built of glass instead of iron—they were broken in the same way that they were vessels made of plates of glass than plates of iron. Whether she is built of this very good iron or very inferior iron, and you will say, if she gets on shore, she has no business there; she was not built to be on shore, but to be at sea, and as long as she is at sea it is very little consequence whether she has the cheap and brittle iron, or the expensive and more malleable material that was at first used. Of course this would lead to distinctions between hullers and boat-builders of different qualities; these qualities, as I said before, are generally deteriorating.

In the discussion which followed no one ventured to contradict Mr. Rundell. On the contrary, his statements were confirmed and approved, and one member, Mr. Luke, said:

I quite understand what Mr. Rundell means by glass plates. I have seen plates which, if you let them fall, would break like glass.

Inferior iron plates, when fractured, start in bad and brittle armor plates when fired at, and reform in the quality of the iron which is made now quite as good as it was formerly.

We are getting iron at the Admiralty as good as it was when the Richard Cobden was built, if the price is paid for it. It is simply a question of price.

There is so much competition now in the mercantile shipping world that a shipbuilder can scarcely live if he is obliged to put in the iron which he knows to be of a quality which can be put into a ship.

The shipowner goes to the cheapest market, and then depends upon the insurance. If the ship is lost the insurance will pay him for it.

We think the public will fully agree with Mr. Reeves that we do not want such ships at any price. We have no doubt there is a large and influential class of ship owners who, like the British shippers described by Mr. Luke, care nothing for the safety of lives and freight provided they can buy ships abroad which are cheap and insurable; but we should have but little to be proud of, or to grow rich upon, in a merchant marine made up of such vessels as can now be had from foreign builders at a lower price than vessels of the same tonnage and capacity can be built for at home.

Locking Up Ore and Coal Lands Under Bogus Leases.

There is a large and dangerous class of swindling speculators against whom the owners of ore and coal lands in newly developed sections need to be warned, and we invite our exchanges in the Southern and Southwestern States to aid in giving publicity to what we shall have to say concerning them. The speculators to whom we refer, having neither capital nor credit, have devised a means of speculating in desirable mineral lands by securing control of them under bogus leases.

When a new country is opened which promises rapid development, they rush in and prospect for the best veins. Finding such as are likely to increase in value within a reasonable time, they represent themselves either as capitalists or as agents of capitalists, and induce the owners of the lands they want to control to give them long leases of the mineral deposits thereon. They agree to assume all the expense of opening

the mines and providing facilities for the transportation of the products, and promise to pay royalty of ten cents per ton, or more, on all minerals mined. The offer seems a fair one, and the swindler is usually able to so impress his victim that the latter readily falls into the trap. Should he have any suspicions, however, his accommodating "capitalist" will cheerfully oblige himself to begin work within six months or a year, and to take out a certain amount annually when the mines shall

have been fairly opened and a given amount raised. The bargain concluded, the swindler puts the lease in his pocket and goes off. If he is not under obligations to open the mines in a certain time, he does nothing to them; if he is, a day's work with one man and a shovel fulfills the terms of the lease. He has no intention of opening the mines at any time. The lease has cost him nothing, and he holds it until the value of the land shall have so increased that he can sell it for a good price to some one who wants to open the veins and work them. In the meantime, the minerals are locked up. The owner of the land cannot dispose of them, and he is often kept waiting for years in poverty and disappointment, while his neighbors are growing rich upon ores and coals not as good, perhaps, as his own. He is powerless in the hands of the rascal who has swindled him, and who has obtained for nothing a valuable lease which he holds until some one will buy him off and release the mineral wealth he has locked up. Hundreds of thousands, perhaps millions, of acres of valuable mining lands of the South are thus leased to irresponsible adventurers, and capitalists who seek legitimate and profitable investments in lands, mining operations or iron manufacture, must take the second choice or pay these shrewd rascals tribute. We know of no remedy for this evil except to put the owners of such lands on their guard. Designing knaves will always find fools to swindle, doubtless, but if their rascality is exposed, some will be warned who might otherwise become easy victims through over-confidence in specious representations.

The Centennial.

In another column of this issue we publish an official circular from Mr. A. T. Goshorn, Director General of the Centennial Exposition, which will be found of interest to intending exhibitors. In a great undertaking of this character, the progress

Counsellor and Solicitor, John L. Shoemaker. By a further Act of Congress, approved June 1, 1873, there was created the Centennial Board of Finance, which was charged with the financial administration of the preparations for the Exhibition. This board was duly organized on April 23, 1873, by the election of a Board of Directors, with John Welsh, Esq., president, and Frederick Fraley, Esq., secretary and treasurer.

4. For the more efficient conduct and management of its affairs, the Centennial Commission has entrusted the direction and supervision of the Exhibition to Commissioner Alfred T. Goshorn, of the State of Ohio, as Director General.

## STATE ORGANIZATIONS.

5. To provide for the efficient adjustment of the preliminaries to the Exhibition, and to organize a uniform system to this end throughout the United States, the several States and Territories are invited and recommended to appoint, as early as possible, State Centennial Managers, not exceeding five in number. They should be selected entirely with regard to their familiarity with the resources, arts, and products of their State, their business experience, and executive skill. The State managers, with the United States Commissioner and Alternate Commissioner, shall constitute the State Board of Centennial Managers for each State and Territory.

On the State Board will devolve all the responsibility of organizing its State or Territory, and of securing its thorough representation in the Exhibition. It will have to care for the interests of its own State and of its citizens in matters relating to the Exhibition; to disseminate information about it; to issue invitations to participate; to receive and pronounce upon applications for space; to apportion the space placed at its disposal among the exhibitors from its State; and to supervise such other details relating to the representation of its citizens in the Exhibition as may from time to time be delegated to it by the United States Centennial Commission.

It is of extreme importance that the State Boards shall be organized and at work at the earliest day possible. It is hoped that all may have been appointed before April 1, 1874.

## PRELIMINARY REGULATIONS.

6. The Exhibition will be held in buildings erected for the purpose in Fairmount Park, in the city of Philadelphia, and will be opened on the 19th day of April, 1876, and closed on the 19th of October following.

7. After the organization of the State Boards, all communications to the Centennial Commission, or to the Director General, relative to articles to be exhibited or requirements for space, must be made through these Boards.

In determining upon the articles to be admitted to the Exhibition, each State Board should so discriminate as to the character and quality of the objects it selects, that the aggregate exhibition of its State shall consist of the best specimens of its products.

8. Full diagrams of the buildings and grounds will be furnished to the State Boards, showing the location and areas assigned to each State and Territory in the Exhibition buildings, on or before the 4th day of July, 1874.

As soon thereafter as may be, but not later than November 1, 1874, the State Boards are requested to notify the Director General whether they desire any increase or diminution of the space offered them.

By the 1st of March, 1875, the Director General will acquaint each State Board with the amount of space at its disposal, and the State Board shall at once apportion it among the exhibitors of its district.

Before October 1, 1875, the State Boards must furnish the Director-General with detailed plans of their allotted space, showing the space of each single object to be exhibited, and also with lists of the exhibitors, and all other information necessary for the preparation of the official catalogue.

9. The Commission is assured that liberal reductions in rates for transportation will be made on railways and water lines in the United States. Specific details as to these rates will be given in a future communication.

The exhibitors or the State Boards must provide for all the expenses of transportation, of the delivery and unpacking of goods, of setting them up in the Exhibition Building, of removing the empty cases, and of repacking and removing the goods at the close of the Exhibition. Provision, however, will be made for storing the cases during the continuance of the Exhibition, without charge to exhibitors, and with as little inconvenience or delay as possible.

10. Heavy articles requiring special foundations, or others which from any cause are difficult of location or adjustment, should, by special arrangement, be set in place as soon as the progress of the work upon the buildings will permit. The general reception of articles at the Exhibition Buildings will commence on January 1, 1876, and no articles will be admitted after March 31st.

Space not occupied on the 1st of April, 1876, will revert to the Director-General for re-assignment.

11. An official catalogue will be published by the Centennial Commission, containing (1) the name of each exhibitor; (2) the name of each article exhibited; (3) the gross and class to which the object is referable; (4) the location of each article in the buildings or park; and (5) an alphabetical index of exhibitors' names.

The right of publishing and selling the official catalogues is expressly reserved to the Centennial Commission.

12. Exhibitors will not be charged for space. Steam power and water will be supplied gratuitously, under rules to be hereafter announced. It will be necessary, in making application for either of these, for the exhibitor to state the quantity required, and the manner in which it is to be employed.

The exhibitors or State Boards must provide, at their own cost, all cases, shelving, counters, fittings, etc. which they may require; and all countershafts, with their pulleys, belting, etc., for the transmission of power from the main shafts in the machinery hall. All arrangements of articles and decorations must be in conformity with the general plan, and under the inspection of the Director General.

State Boards must obtain the written approval of the Director General before constructing roads or earthworks in the grounds assigned to them.

The Centennial Commission will take precautions for the safe preservation, of all objects in the Exhibition; but it shall in no way be responsible for damage or loss, or for accidents by fire or otherwise, however originating. Exhibitors or State Boards may insure their own goods, for which favorable facilities will be arranged; and they may employ agents of their own choice, subject to the approval of the Director General, to guard them during the hours the Exhibition is open to the public.

13. The State Boards, or the individual exhibitors, or such agents as they may designate, shall be responsible for the receiving, unpacking, and arrangement of objects, as well as for their removal at the close of the Exhibition. But no person shall be permitted to act as such agent until he can give to the Director-General written evidence of his having been approved by the proper State Board.

14. Articles that are inflammable, explosive, or in any way dangerous or offensive, will not be admitted to the Exhibition, and, if introduced, will be immediately removed. The Com-

mission, will, from time to time, make any particular regulations concerning the exhibition of such substances that may seem necessary.

15. Objects sold can in no case be removed before the close of the Exhibition.

16. Photographic or other reproductions of articles exhibited, will only be allowed upon the joint assent of the exhibitor and the Director-General. But general views of portions of the building may be made upon the Director-General's sanction.

17. Each person who becomes an exhibitor thereby acknowledges and undertakes to keep the rules and regulations established for the government of the Exhibition.

18. Special regulations will be issued concerning the exhibition of fine arts, the organization of international juries, and awards of prizes, and on other points not touched upon in these preliminary instructions.

A. T. GOSHORN, Director-General.

PHILADELPHIA, November 12, 1873.

## PHILADELPHIA CORRESPONDENCE.

PHILADELPHIA, Dec. 8, 1873.

Notwithstanding that the week under review has been what is usually a dull period, being "document week," when the annual statements of the executive officers of the administration are received, there is to be noted a very decided improvement in nearly all kinds of trade. In iron your correspondents in this and other markets keep you posted, but the improvement is notable also in other branches. The cotton mills and print works of Manayunk are all running again, and many on full time, the others proposing a full resumption early in January. The wool men are also active, and there has been quite a speculation in this line, with an advance of from one to three cents per pound. The streets once more show lines of loaded drays and the steamers are all crowded with freight, while more is seeking outward capacity than can be accommodated. I note these features of general trade as of equal importance to the iron manufacturers and hardware dealer as to the dry goods merchant. Everything now points to a busy and active spring trade to open earlier than usual, and preparations are being made with this view. Notwithstanding the contradictory opinions in financial matters held by members of Congress—no less than three hundred different bills having, it is said, been prepared on the project—there is every probability that an extension of one hundred millions will be made to the currency, and that some regulation will be made as to the issue of a convertible bond, bearing 3-65 per cent. interest. That this is almost certain appears from the fact that some corporations who have been hesitating in engaging in extensive operations, of which you will hear further, have determined to go ahead, after having thoroughly canvassed the disposition of Congressmen on the subject. The war feeling, though not so blatant as at the first receipt of the news, is growing daily stronger, and many conservative men, who would otherwise deprecate hostilities between our country and any other, look upon a possible Spanish war as an escape from labor and other troubles likely to be otherwise encountered. The late Emperor of the French thoroughly understood the necessity of keeping the French people occupied to ensure peace; and the successful party in the United States, to retain power, must invariably so shape things as to keep wages high and currency abundant. In this respect the two peoples are very similar. There are two formidable strikes announced at the close, one of which may seriously affect the general public. The first is that of the carpet weavers, always a troublesome element, but who this time do not seem unanimous in their action. The second is among the train men of the Reading Railroad Company. The latter have struck against a ten per cent. reduction of wages. Both the company and the men are firm in their determination to hold out, and the effect may be serious as it will prevent many collieries from working, and has indeed already caused the suspension of several. The hands of the Mahoning and Broad Mountain and Shamokin branches first stopped work, and those of the main line refused to take their places. To further complicate the matter, the miners in many collieries have struck against three-quarter time. All this is bad, as any advance in coal now would stop until spring many works which would otherwise resume.

The new blast furnaces finished here this year, by Stephen Robbins & Son, will be shortly blown in, and thus test the much mooted question whether the banks of the Delaware are or are not the proper place to make pig iron. A description of this furnace has appeared in your columns. The engine has lately been put under steam, and every thing works "like a clock." Should this venture be successful, there is no doubt that our river banks will be the site of many large blast furnaces before long. Six new furnaces in this immediate vicinity on the river are proposed, so far at least as to have the capital secured, which does not look like fear of the iron market.

Among the news of the week is the completion of the Illinois, the fourth steamer of the American line. She will have steam on her engines on Wednesday, and on the 24th instant will make her trial trip, and take her place in the line on January 1st, 1874. The Messrs. Cramp deserve great credit for the way in which they have carried out their contract for these ships. They have had about every obstacle to contend with which could have been foreseen, and a host which no one counted on. From advanced far above anyone's expectations, labor followed suit, opposition lines, and, finally, the panic—all came before their contract was filled, and yet every ship has been up to time, and in qualifications surpassed the requirements. This firm will also test the engines of the Columbia, of Clyde's New York and Havana line, this week, which ship is to go to sea by New Years. The Red Star line received a new ship from abroad during the week, the Nederland, which is like the Vaderland, her consort, a first-class brig rigged steamer, 345 feet long, with 40 feet beam, and a passenger capacity of about 1000 passengers of all grades. She has compound engines of the best make, and is rated at 11 knots under steam alone, with a daily consumption of 25 tons coal. This vessel arrived on Monday and cleared on Saturday again with a full assorted cargo. The monitor Manhattan also sailed again on Saturday, having been put in trim at Wilmington after her disaster. The trouble was that she went to sea with her turret up in fighting trim, and ventilating funnels open, which latter are only intended for port, and, consequently, took in much too much water. The big gun of the navy, the Terror, double turreted monitor, is nearly finished, and will clear for "Key West and a market" this week. She is said to be the most formidable iron warship afloat. The Canadagua frigate, and Ajax, single turret monitor, are nearly ready, and the navy yard force is still working "double turn," with 823 men in the construction department, 91 in docks, 224 at steam engineering, 168 in equipments, and a host more in outside jobs.

There have been several Western and Southern iron men in town lately, looking after blast furnace machinery, among whom were the presidents of the Etna Iron Works, of Lawrence county, Ohio, and of the Rising Fawn Iron Works, of Dade county, Georgia. The

works of the former are well ahead, and are to be models, it is said; will have two furnaces, one of them already supplied with the Fairlie self-coking apparatus, and both furnished with the Whitwell hot blast stove, by which the blast may be heated to 2000° with safety. I know that the subject of hot blast is the red rag to the bull among furnace men, but the Whitwell hot blast fire-brick stoves are fast coming into the same favor here as in England and on the Continent. They have already been adopted by the Cedar Point Iron Co., of Essex, N. Y., which has four building; the Hartford Furnace Co., of Maryland, which will have two; the Rising Fawn Co., of Georgia, which will use eight; the Etna Furnaces, near Ironton, Ohio, which are putting up eight; and the Meier Iron Co., of Carondelet, Mo., which will have eight also. Every form of hot blast has its friends, but one which can heat the blast to 2000°, and keep it steady at 1200° of temperature without expense for repairs, and as this has been done in one case in England for five years, with only an outlay of £50 for repairs, deserves notice, and the attention of furnace men.

Messrs. Morris, Tasker & Co., the great tube and pipe makers, have lately introduced a novelty which would indicate value to many trades. This is the "vulcanized rubber coated iron tube." It is claimed for this article that for water passage, hot or cold, it is far superior to galvanized or plain iron, or other pipes. An examination by Booth & Garrett, the well-known chemists, results in the statement that it will bear a high degree of heat—over 300°. Gas and water have no possible effect on it, and the coating firmly resists sulphuric and muriatic acids and caustic potash solution. It is further claimed that this invention can be applied to all articles of iron now galvanized, with much better results. It is not likely that a firm with the reputation of Morris, Tasker & Co., would introduce to the trade anything not positively an improvement, and hence this may be regarded in the light of a wrinkle of probably great value. In the simple matter of ship plates and framing alone it would seem to offer exactly what builders have been seeking, and tests of the action of iron coated with vulcanized rubber in contact with copper should be made. If it resists the chemical action in such a test, it would be an invaluable discovery.

The "one rail railroad" was briefly noticed some time since in my correspondence as a success. The proprietor of the system is now fitting up his track in a skating rink here to publicly test a four-ton steam bicycle, and which test I will describe when it is made. The locomotive I have not seen, but the model works splendidly in a circular track, and nothing short of an earthquake can throw it off the rail. The track is of timber, eighteen inches high, and only requiring 12 feet of timber measure to the linear foot of track. The rail, either of crescent or T shape, is fastened to the apex of the conical track, and on this two grooved drivers placed tandem, like those of a bicycle, travel. But the grand feature is the safety system of tangential wheels, which term I use for lack of a better, and which projecting down and under the body of the locomotive, at an angle of 45°, engage the sides of the prismatic track and balance the bicycle. These offer little frictional resistance, traveling as they do against the sides of the track, and enable the passage of a curve of smaller radius than has ever been accomplished in engineering; the patentees claiming indeed to run on a curve of only 33 feet radius.

The engine and cars cannot possibly leave the track, and any rate of speed may be gained which the power will furnish without danger of derailment. The design was originally for an elevated street railway, and the locomotive is built for such a road in Atlanta, Georgia, but the advantages for new country railroads, coal and ore roads, and mine roads, are manifest. The whole road can be built and equipped for less than half the cost of an ordinary road, and for your people who want to get from the Battery to Harlem River in short time this invention offers the means. For country purposes it can be built entirely of timber at very low cost.

The imports of iron and metals for the week include the following:

*Tin Plate*—N. & G. Taylor, 954 boxes; N. Trotter & Co., 365 do.; Hall & Carpenter, 200 do. *Steel Axles*—Naylor & Co., 104. *Wire*—Peter Wright & Co., 2 cases; F. W. Moss, 5 cases do. *Files*—F. W. Moss, 3 cases. *Hardware*—F. W. Moss, 1 case; Bailey & Co., 2 do. *Boiler Flues*—C. F. Rumpf, 100 bbls. *Machinery*—Order, 2 cases.

The following figures represent the statistics of coal carried by the Philadelphia and Reading Railroad to Nov. 30th, ult.

Over main line and Lehigh Valley..... 4,137,636  
Over laterals for shipment by Sch. Canal..... 735,047  
West via N. Central R. W. and Cat. & Wp. .... 301,888  
Baltimore & Ohio..... 107,595  
West and South from Piney Grove..... 150,770  
Lehigh and Wyoming coal..... 107,261  
Total anthracite paying freight..... 5,890,149  
Bituminous coal..... 310,266  
Total of all kinds paying freight..... 6,190,415  
Cost for Company's use—  
Anthracite..... 343,050  
Bituminous..... 35,087  
Total..... 368,137  
Total of all kinds..... 6,458,533  
Tonnage on Schuylkill Canal..... 743,796

The following figures represent the statistics of coal carried by the Philadelphia and Reading Railroad to Nov. 30th, ult.

Offices, 187 Bedford St., Strand, London, W. C. .... 152 Broadway, New York.

CEO. ED. HARDING, C. E. .... Representative in United States.

This the most successful English Engineering Journal, containing thirty-six pages, weekly, illustrating the latest advances in Civil, Mechanical, Mining and Military Engineering, Science, both Pure and Applied, and the latest developments in the arts of Manufacture, Agriculture, Chemistry, and the like. It is published every month, and is to be obtained by American subscribers, post paid, for \$9.30, currency, per year, sent to the New York office of Elizabeth.

The important details of the buildings and works erected at the great Vienna Exposition will be illustrated and described in Engineering for the current year; and this, with illustrations of all the larger American engineering structures, will render it valuable to the American Engineer, Architect, Iron Master and Machinist.

The best medium for advertising American Machinery to the attention of European capitalists. Send for specimen copy, free.

NEW YORK, July 1, 1873.

THE ATTENTION OF MANUFACTURERS AND

business men is called to the natural advantages of Bristol, Bucks County, Pennsylvania, for a manufacturing site, situated on the River Delaware, with a river front of over one mile, navigable for vessels drawing 15 feet water, 18 miles from Philadelphia, on the line of the New Jersey Division, Pennsylvania Railroad, between Philadelphia and New York, and at the terminus of the Delaware Division of the Lehigh Canal, by which coal and iron are brought to our town cheaper than at any other point between New York and Philadelphia.

Bristol is noted as being a very healthy place, with cheap homes and low rents, good public and private schools, six churches of different denominations, and several manufacturing establishments already established. It contains a population of over 5000, and is constantly increasing in size and population.

Believing that Bristol possesses advantages that few other towns possess, and that the attention of manufacturers need only be diverted in this direction, the Burgess and Council have enacted the following ordinance, viz.:

*Be it ordained and enacted, by the Burgess and Council of the borough of Bristol, and it is hereby ordained and enacted by the authority of the same,*

*That all manufacturers which shall be erected within the borough of Bristol, during the period of ten years from and after the passage of this ordinance, shall pay for and during said period be exempted from the payment of boro tax.*

Enacted into an ordinance at the Council Chamber, this fourteenth day of July, A. D. 1873.

CHARCOAL IRON.

Parties owning a large and very superior Furnace, 90 miles from Cincinnati, and an unlimited supply of the best Iron Ore, adjoining it, with abundance of timber for making Charcoal, wish to enter into arrangements with men of experience and means to run the Furnace for a term of years, under arrangement to be agreed upon. There is no place in the United States where Charcoal Iron can be made at as low a cost, or where transportation to market will cost less. Apply to

JOHN A. POMEROY,

No. 47 West Second St., Cincinnati, O.

CHARLES E. SCOTT, Burgess.

Attest: J. WESLEY WRIGHT, Clerk.

BRISTOL, Pa., July 31, 1873.

## Special Notices.

## Map of the Mineral Resources of Chattanooga, Tennessee, and Vicinity.

Compiled from surveys made with a special view

of showing the location and boundaries of the three

# Trade Report.

Office of THE IRON AGE.

WEDNESDAY EVENING, Dec. 10, 1873.

The past week has been free from excitement in the financial markets, and has been chiefly characterized by a marked improvement in all classes of securities. This improvement is in a great degree attributable to the issue of new legal tenders by the Treasury. In the stock market a better feeling has been caused by the abandonment of the bankruptcy proceedings against the Grinnell estate, as contracts were involved to the amount of about \$13,000,000.

The money market has been easy, with 5 per cent. to 7 per cent. gold, as the extreme rates for call loans. Mercantile paper is fairly quoted at 9@12 per cent. The news from London is favorable, the Bank of England discount rate having been reduced to 5 per cent., and rates outside of the bank having declined to 4@4%. For several days past all fear of war with Spain over the Virginia affair has subsided, and as the indications are in favor of a peaceful compliance on the part of the Cubans with the orders from Madrid, we shall probably come out of the difficulty with the satisfaction of knowing that we have escaped the curse of war, without any material sacrifice of national pride. A war at this time would have been a most disastrous calamity to the country, and as the cause of the Virginians was, at best, a doubtful one, we do not think the business community have favored the idea of regarding her seizure and the murder of her passengers and crew as a *causus belli*. Notwithstanding the disturbing rumors, our local banks have been steadily gaining strength, and on the date of the last statement had about \$7,500,000 of legal tenders above the 25 per cent. requirement.

The gold market has been quite steady, considering the uncertainty attending the conclusion of our negotiations with Spain, and the fluctuations of the premium have been within comparatively narrow limits. The following shows the highest and lowest daily quotations:

	Highest.	Lowest.
Thursday	109	108 1/2
Friday	109 1/2	109
Saturday	109 1/2	109 1/4
Monday	109 1/2	109
Tuesday	109 1/2	109 1/4
Wednesday	109 1/2	109 1/4

There has been some speculative excitement on the Stock Exchange, and in some stocks the transactions have been of considerable magnitude. Prices have advanced, and the general tone of the market is strong, if not buoyant. The principal dealings have been in Western Union, Lake Shore, Union Pacific, Northwestern, Pacific Mail, St. Paul, Rock Island, Wabash and N. Y. Central. We give below the highest and lowest of to-day's prices on change.

The market for government bonds has been strong. Southern State bonds have appreciated in value, and desirable railroad securities are recovering. We quote the closing prices of governments.

The following tables show the foreign trade movements for the week:

IMORTS.

	1871.	1872.	1873.
Tot. for week	\$2,047,939	\$3,948,566	\$5,098,110
Prev. reported	531,529,746	306,578,480	329,366,000

Since Jan. 1... \$356,577,685 \$400,317,046 \$364,469,112

Included in the imports of general merchandise for the week are:

	Quant.	Value.
Anvils	6	\$149
Brass rods	37	6,090
Blanmuth	1	660
Bronzes	60	11,400
Cables and anchors	192	18,183
Copper	7	7,469
Cutlery	95	28,468
Guns	29	7,858
Hardware	40	5,848
Iron pig. tons	279	21,287
Iron sheet. tons.	38	3,150
R. R. bars	4,880	1,884
Iron cotton ties	690	2,474
Iron cast. tons.	1,92	18,287
Lead. pigs.	10,174	65,780
Lead. tons.	6	535
Metal goods	162	23,373
Nails	8	282
Needles	7	5,218
Old metal	6,764	
Plated ware	2	260
Per. caps.	13	3,693
Saddlery	13	21,491
Steel	55	8,633
Spirals	13	6,122
Silverware	11,102	93,967
Tin. boxes	263	448
Tin. 3000 slabs.	69,138	
Wire	380	4,142
Zinc	165,180	11,140

EXPORTS, EXCLUSIVE OF SPECIE.

	1871.	1872.	1873.
For the week	\$3,947,436	\$4,344,898	\$5,170,064
Prev. reported	216,743,987	216,659,065	277,179,045

Since Jan. 1... \$223,690,423 \$231,003,963 \$284,349,109

EXPORTS OF SPECIE.

	1871.	1872.	1873.
Total for the week	\$571,465		
Previously reported	46,040,628		

Total since January 1... \$46,612,996

Government bonds closed as follows:

Bid.	Asked
U. S. 1881, reg.	114 1/2
U. S. 1881, cou.	118 1/2
U. S. 5-20 1862, reg.	111
U. S. 5-20 1862, cou.	111 1/2
U. S. 5-20 1864, cou.	114 1/2
U. S. 5-20 1865, cou.	114 1/2
U. S. 5-20 1866, cou., Jan. and July	117 1/2
U. S. 5-20 1867, cou.	118
U. S. 5-20 1868, cou.	117 1/2
U. S. 10-40 reg.	118 1/2
U. S. 10-40 cou.	111
U. S. Currency Pacifics.	111
New 5s. 1881.	110 1/2

The following were the highest and lowest prices of stocks to-day:

Highest.	Lowest.
N. Y. Cen. & Hudson Consolidated	96
Lake Shore	77
Rock Island	98 1/2
Del. Lack. and West.	100
Wabash	54 1/2
Western Union Telegraph.	73 1/2
Northwestern.	56
Milwaukee & St. Paul.	42 1/2
Milwaukee & St. Paul, Preferred.	64 1/2
Panama.	101
Pacific Mail.	41
Eric.	45 1/2
Ohio & Mississippi.	31 1/2
Boston, Hartford & Erie.	2 1/2
U. S. & N. J. Central.	37 1/2
C. C. & Ind. Central.	37 1/2
Hannibal and St. Joseph.	28 1/2
Hannibal & St. Joseph, Preferred.	37 1/2
Quicksilver.	28 1/2
Consolidation Coal.	49 1/2
Adams Express.	91
American Merchants' Union Express	59

## GENERAL HARDWARE.

The chief interest in Hardware circles is now centered on the future. Of course, at this season there is little business doing, and stock-taking and settling up the business of the year is now in order. A good deal of curiosity, also, is manifested as to changes to be made at the beginning of the year. That there will be a good many is generally admitted, but they are not expected to be very radical.

We have been shown a new Shovel, which looks to us like an article of great promise. Its peculiarity is that it is made of one piece, without strap or rivets, being pressed into shape by machinery. It is claimed that it can be made lighter and stronger than others, and has nothing about it for the dirt to adhere to. The handle is straight, and fits into a socket, giving it the same bend as the ordinary shovel. This article is patented, and it is intended to put it on the market about the middle of next month.

The Hart, Bliven & Mead Mfg. Co. have taken a lease for three years longer of the building they now occupy. The Wilson Mfg. Co. are preparing a new catalogue, with revised prices, which they will have ready about the middle of January.

Baeder, Adamson & Co. issued since our last, though dated the 1st instant, the following price list of Sand Paper, &c., which is a reduction of 25 cents per ream on Flint, and 50 cents on Emery Paper:

Per ream.	
Flint Paper, No. 00 to 1 1/2.	\$4.25
" No. 2, 3 1/2 and 3.	4.75
Star Paper, all numbers	3.25
Emery Paper, No. 00 to 1 1/2.	6.50
" No. 2.	10.9
" No. 3.	9.50
Emery Cloth, No. 00 to 1 1/2.	20.00
" No. 2.	22.00
" No. 2 1/2.	26.00
" No. 3.	28.00
Roll Extra Flint Paper in 50 yard roll.	Per yard.
No. 00 to 1 1/2.	9c.
No. 2.	10c.
No. 2 1/2.	11c.
No. 3.	12c.

Agreeable to a notice issued by the President and Secretary of the National Association of Saw Manufacturers of the United States, a convention of the representatives of this industry assembled at the Kennard House, Cleveland, Ohio, on Wednesday and Thursday last week. It is a matter of regret among the friends of the association that a quorum could not be obtained. The meeting was adjourned on the 4th instant without transacting any of the business for which it was convened. The following is the substance of a resolution presented by the executive committee: Owing to some members of the association having broken the prices agreed upon at their last meeting, it is no longer possible to sustain the net prices then established. It is, however, recommended that the trade continue to use the uniform list, the net price or discount to be optional with each manufacturer. It was also recommended that the organization be continued for the interchange of views, &c., as may be to the interest of the trade in the future. Our readers will remember that at the inaugural meeting of the association in March last the price of Hand Saws was not touched; the Saws affected by the combination were Circular and Top Saws, Shingle, Veneer, Mill, Mulay, Gang, Drag, Cross Cut and Pit Saws and Fay's Scroll Webs.

The manufacturers of Cordage reduced the price of Manilla, Sisal and New Zealand Rope half a cent per lb. on the 9th instant. The following is the revised list:

Manila Cordage, sizes above 12 th'd.	cts.
6 th'd and 9 th'd (3/4 in. and 5 1/2 in. diam.)	17
" 6 th'd and 9 th'd (3/4 in. diam.)	18
Manila Cordage, 12 th'd (3/4 in. diam.)	17 1/2
" H. Ray. Cordage, 12 th'd (3/4 in. diam.)	17 1/2
" Cordage, bolt rope yarns.	19
9 th'd.	20
Tar'd Manilla.	16 1/2
Fine Tar'd Manilla Lath Yarn.	18
Sisal Rope, sizes above 12 th'd.	15
" 6 th'd and 9 th'd.	15
" 12 th'd and H. Ray. H. Ray.	15 1/2
New Zealand Cordage, sizes above 12 th'd.	15
New Zealand Cordage, 6 th'd and 9 th'd (3/4 in. and 5 1/2 in.)	16
" H. Ray. H. Ray.	15 1/2

On the 4th instant the manufacturers of Copper reduced the price of Sheathing, Braziers' Copper, Bolts, &c., 5 cents per lb. The revised list is given below:

SHATHING, BRAZIERS' COPPER, BOLTS, &c.	Quant.	Value.
Anvils	6	\$149
Brass rods	37	6,090
Blanmuth	1	660
Bronzes	60	11,400
Cables and anchors	192	18,183
Copper	7	7,469
Cutlery	95	28,468
Guns	29	7,858
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Lead. tons.	6	535
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Steel	55	8,633
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Silverware	11,102	93,967
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U. S. 5-20 1865, cou.	114 1/2
U. S. 5-20 1866, cou., Jan	

## THE IRON AGE.

The increase in the supply of anthracite coal from the different regions up to Dec. 1, 1873, over 1872, is as follows:
Schuylkill..... 126,349
Lehigh..... 812,661
Wyoming..... 194,415
Shamokin..... 57,324
Lykens Valley..... 4,825

A portion of the increase, via the Lehigh, is from the Wyoming region, which, if deducted and added to the increase from the Wyoming, would give a very fair proportionate increase from the three principal coal regions so far this year.

The following dispatch, received yesterday, is of interest:

**POTTSVILLE, Penn.**, Dec. 8.—The railroad strike continues, though there is very little change in the situation. At Tamaqua it is said the operatives are about resuming, and it is probable the strike will end in a few days. The effect upon the coal trade will not be very serious, even should it continue, as there is a large stock of coal on hand.

## PHILADELPHIA.

**PHILADELPHIA, Dec. 9, 1873.**

The market continues moderately active, without very material change since my last, but with a decided upward tendency in prices. The volume of business has, however, been larger, and the inquiry more general for all grades of Pig Metal. The furnace companies are firm and decided in their views, and, with scarcely an exception, decline to name prices for 1874 deliveries, or to contract for Iron ahead at anything like present prices. The impression prevails here that a fairly active trade will open early in January at about \$36. No. 1 Foundry is a bar-sis for the season's transactions.

In Manufactured Irons there is little doing, but decidedly more inquiry from car and other works in the interior, some of whom are anxious to place specifications for large orders at 27 cts. to 28 cts. per lb. The mills, however, refuse less than 3 cts., and in some instances ask 3 1/2 cts., which latter rate is the selling price from store. The puddlers at the Catawissa Manufacturing Co.'s Works still remain out, and have lately refused the offer of \$5.25 per ton, demanding Philadelphia rates, which, with helper's allowance, are now \$6.25. This is the largest Bar Iron mill east of the Alleghenies, with a production of over 30,000 tons annually; and in view of the small stocks of Finished Iron at most other works, a prolonged stoppage there must make demand elsewhere.

**Rails.**—There have been no transactions to note, but more inquiry and some contracts pending.

**Old Rails** are scarce in this market, but there is next to no demand for them at prices asked, which range from \$37 to \$38.

**Scrap** is also scarce for prime No. 1 Wrought, and Piling Scrap is more sought for, holders of the small lots here asking \$35 to \$36, prompt cash.

The sales to note include the following: 2000 tons Lehigh Gray Forge at \$27, on cars at furnace; 2000 tons Schuylkill Gray Forge, on private terms; 2000 tons No. 1 Lehigh Foundry at \$33, here; 1000 tons No. 2 Schuylkill Foundry at \$28, here; 1000 tons No. 2 Schuylkill Foundry at \$28, here; 500 tons No. 1 Lehigh Foundry at \$34, Hoboken, 60 days and interest; 1000 tons, one-half each No. 1 and 2 Lehigh Foundry, equal to \$32.50 and \$30.50, at furnace.

The following prices are a fair quotation of the market:

**PIG IRON**—No. 1 Foundry, \$34 to \$35, the latter asked for choice Lehigh brands; No. 2, \$31 to \$32. **GRAY FORGE**, \$29 to \$27, at furnace.

**WHITE AND MOTTLED**, \$24 to \$26.

**BARS**, 3c. to 3 1/2c.

**RAILS**—Price nominal at \$65 to \$68.

**OLD RAILS**—No demand, \$37 to \$38 asking.

**SCRAP**—No. 1 Wrought, best Piling Scrap, \$35 to \$36.

[Latest by Telegraph.]

**PHILADELPHIA, Dec. 10.**—The following additional sales are reported: 1000 tons Schuylkill Forge; 500 tons Schuylkill Mottled, at \$24; 1500 tons Schuylkill No. 2 Foundry, at \$28 at furnace. Actual sales of Pig Metal in last 14 days foot up to nearly 40,000 tons.

## PITTSBURGH.

**PITTSBURGH, Dec. 6, 1873.**—There is a much better feeling, both in manufacturing and commercial circles, although business always slacks off at this particular time, and no material improvement can reasonably be expected now until after the close of the year and yearly settlements are closed up. The dark clouds that have been hanging over us for some time past seem to be breaking up, and it is hoped will soon disappear. During the week there has been but a single suspension—the Mechanics' Savings Bank—a small concern, and its managers claim, if a little time is allowed, that they will be able to meet all their obligations. Ira B. McVay & Co., suspended bankers, have filed a petition for voluntary bankruptcy. They had arranged with the majority of their creditors, who granted them an extension to resume business again, but some of the small claimants refused to comply with the arrangement. In hopes that by so doing they would get their claims satisfied at once, in order to get them out of the way. Hence, under these circumstances, it was deemed best to take the course in question. There was a meeting of the creditors of S. McLean & Co., another suspended banking firm, the other day, at which McLean submitted a statement of his assets and liabilities, which, it is said, showed a surplus of \$60,000. It was agreed not to interfere with the assignees who have the matter in hand. The National Trust Company has gone into the hands of a receiver, and measures have been taken by the bank to force R. J. Grier, the late cashier, into bankruptcy. The stockholders of this concern are individually liable, and the indications at this writing are that they will have to make up a deficit of from \$90,000 to \$100,000. B. McVay, the defaulting secretary of the Rockwood and Boatmen's Insurance Company, has taken his depositors' books, and is in possession of the Eureka. It was resolved to wind up its affairs and dissolve. It is understood that the stockholders will realize only about 50 cents per share after making up the deficit. The other company, the McLean's, also had a meeting of its stockholders this week, at which it was decided to make up the deficit and continue the business. It is reported (your correspondent cannot speak for its correctness) that the Cascade and Escanaba Iron Companies either have, or are likely to get, an extension, which, I hope, is true, as there are some good men in them, and, beside, there are other important interests, the

welfare of which hinge on the action of the creditors of these two companies. The Pig Iron trade has been more active this week, at least there were more sales reported than for some time past, and, as a consequence, there is a firmer feeling, although prices are still unsettled and irregular, and commission merchants report that buyers and sellers generally are wide apart in their views. There have been a number of sales of good Gray Forge Mill Irons within the past week, and the price is quoted at \$27 to \$28.40 per ton. It is said that there are now a good many buyers at \$25, cash, and but few sellers. Producers allege that the figure in question does not cover the cost of making it from \$3 to \$5 per ton; hence it is only those, as a rule, who are pressed for money that are selling at prevailing rates, and the general sentiment just now appears to be that choice Mill Iron at \$25, cash, is good property, and this accounts for the fact that there are now but few sellers at this figure.

Findings for common dials and no improvement is expected until after the close of the year. Prices may be quoted nominally at \$30 to \$35. 4 mos, according to quality. The market for finished Iron continues quiet, and in a general way presents but little that is really new or important. Orders are slackening off, as they nearly always do at this particular time, while prices remain unchanged. Nails continue dull, and, at a meeting of the association on Tuesday last, it was agreed to reduce the cars 10 cents per ton around the country. Our nail manufacturers report trade dull, although none of the mills have shut down as yet; prices are weak, and in some instances, concessions are being made. The demand for Tools continues meagre, and it is intimated that while the card remains unchanged, there has been some pretty sharp cutting going on late. The works of Klemm, Paus & Co. have been suspended for some time, but it is expected that they will start in again within the next few days. The Window Glass trade continues quiet, as it always is at this season of the year; none of the factories have started up as yet, and it is difficult at this writing to say when they will. Manufacturers are determined not to resume until the latter are willing to go to work at the reduced rate, and the latter do not seem to be prepared for that, as yet.

The Pittsburgh *Commercial* of Dec. 6, says: There has been considerable inquiry for Pig Iron during the past week, and we hear of a good many transactions, mostly at low figures for cash. Even such firms as are selling at \$28 per ton for cash, are holding at \$27 to \$28 per ton, a monotonous range. Correspondingly large portion of the trade reported as prompt cash, as the consumers who wish to buy on time are unwilling to purchase while the differences between cash and time price remains at \$2 to \$3 per ton. In addition to the sales reported, we have heard of several others, but being without particulars cannot include them in report. We are reported the following:

BITUMINOUS COAL SMELTED FROM LAKE SUPERIOR ORE.	
300 tons Gray Forge red short.	\$25.00—cash.
300 tons Gray Forge red short.	25.00—cash.
200 tons Gray Forge red short.	25.00—cash.
100 tons Gray Forge neutral.	25.00—4 mos.
100 tons Gray Forge neutral.	25.00—cash.
100 tons Gray Forge red short.	25.00—4 mos.
50 tons Gray Forge neutral.	25.00—4 mos.
50 tons Gray Forge red short.	25.00—4 mos.
50 tons Gray Forge red short.	25.00—4 mos.
10 tons Foundry.	30.00—4 mos.
10 tons No. 2 Foundry.	34.00—4 mos.
10 tons No. 2 Foundry.	33.00—4 mos.
ANTHRACITE.	
100 tons No. 2 cold short.	\$26.00—4 mos.
30 tons No. 1 Foundry.	39.00—4 mos.
90 tons mottled cold short.	32.00—4 mos.
10 tons No. 3 red short.	30.00—4 mos.
10 tons No. 1 Foundry.	35.00—4 mos.
EASTERN CHARCOAL.	
20 tons cold blast.	\$50.00—4 mos.
30 tons cold blast.	48.00—4 mos.

## BOSTON.

**BOSTON, Dec. 6, 1873.**—The demand for Refined Bar Iron is light, and prices are irregular. American English Refined Bar are selling at \$78 to \$85 per top for the ordinary sizes, and \$90 to \$95 for extra sizes, according to size. Cast Steel is quoted at 15c. for English gold, 17 1/2c. currency, and 14 1/2c. to 16c. for American currency. Cast Steel selling at 16c. per lb.; Chain Chain 1/2c. to 2 in. thick, to 3 1/2c. per lb.; Coil Chain 7/8c. to 16c. from 3 1/2 to 1 in. Boiler Plates remain steady. We quote at 7c. to 7 1/2c. for Flanges, to 5 1/2c. for C. No. 1, and 4 1/2c. to 5c. per lb. for common and Tank. Russia Sheet is steady at 18c. gold, and 19 1/2c. to 20c. currency, for perfect lots. English and American do, is very firm and selling at 7c. to 8c. per lb. currency. Sheet Iron remains steady and quiet at unchanged prices. We quote No. 10, 12, 14, 16, 18, 21 to 24c. per lb.; 25 and 27c. 27. 24c. to 28c. Nails are in fair demand, with sizes at 24c. to 28c. for 100 lb. Horse Nails, 28c. for No. 7. —*Commercial Bulletin.*

## CINCINNATI.

**Messrs. ADY, HULL & CO.**, under date of Dec. 8, write us as follows: There is more disposition to buy at the very low prices at which some grades have been offered. The general stoppage of foundries and mills for a few weeks is anticipated, and the consumption will be curtailed.

HOT BLAST CHARCOAL.	
Hanging Rock No. 1. 10 tons.	\$39.00 @ 40.00—4 mos.
" No. 2. 10 tons.	36.00 @ 38.00—4 mos.
" Forge. 10 tons.	36.00 @ 31.00—4 mos.
Tennessee No. 1. 10 tons.	36.00 @ 38.00—4 mos.
" Forge. 10 tons.	36.00 @ 31.00—4 mos.
Alabama No. 1. 10 tons.	38.00 @ 39.00—4 mos.
" No. 1. 10 tons.	40.00 @ 41.00—4 mos.
" No. 1. 10 tons.	37.00 @ 39.00—4 mos.
COLD BLAST STONE COAL.	
Missouri No. 1. 10 tons.	\$38.00 @ 39.00—4 mos.
" Forge. 10 tons.	36.00 @ 38.00—4 mos.
Ohio No. 1. 10 tons.	36.00 @ 38.00—4 mos.
" Forge. 10 tons.	36.00 @ 30.00—4 mos.

## BALTIMORE.

**Messrs. WIRTH & BROTHERS**, Iron and Steel merchants, corner of South Charles and Lombard streets, report us the following prices under date of Dec. 9, 1873: Our market still continues dull and unsatisfactory, with a limited amount of inquiry to satisfy immediate wants. Quotation figures are shaded for desirable orders.

AMERICAN REFINED BAR IRON.	
1 to 6 wide by 1/2 to 1 thick..... 3 1/2c. to 3 1/2c. per lb.	1 to 6 wide by 1/2 to 1 thick..... 3 1/2c. to 3 1/2c. per lb.
6 to 12 wide by 1/2 to 1 thick..... 3 1/2c. to 3 1/2c. per lb.	6 to 12 wide by 1/2 to 1 thick..... 3 1/2c. to 3 1/2c. per lb.
Hoop Iron, 1 1/2 wide and upward..... 4c. to 5c. per lb.	Hoop Iron, 1 1/2 wide and upward..... 4c. to 5c. per lb.
Band Iron, from 1 1/2 to 4 in. wide, 4 to 4 1/2c. per lb.	Band Iron, from 1 1/2 to 4 in. wide, 4 to 4 1/2c. per lb.
Horse Shoe Iron 1/2 to 1 wide by 1/2 to 1 thick..... 5 to 5 1/2c. per lb.	Horse Shoe Iron 1/2 to 1 wide by 1/2 to 1 thick..... 5 to 5 1/2c. per lb.
Norway Nail Rods..... 7 1/2c. to 8c.	Norway Nail Rods..... 7 1/2c. to 8c.
Black Diamond Cast Steel, Plates, Squares and Octagon, ordinary sizes..... 16 1/2c. to 18c.	Black Diamond Cast Steel, Plates, Squares and Octagon, ordinary sizes..... 16 1/2c. to 18c.
Cast Spring Steel, Plates..... 11c. to 12c.	Cast Spring Steel, Plates..... 11c. to 12c.
Homogenized Steel Plates..... 13c. to 14c.	Homogenized Steel Plates..... 13c. to 14c.
Perkins' Horse Nails, per kg. of lbs..... 16 1/2c. to 17 1/2c.	Perkins' Horse Nails, per kg. of lbs..... 16 1/2c. to 17 1/2c.
Common Horse Nails, from 14c. to 18c. per pound..... 10 9 8 7 6.	Common Horse Nails, from 14c. to 18c. per pound..... 10 9 8 7 6.
Putnam Horse Nails, 23 24 25 26 28c. per lb.	Putnam Horse Nails, 23 24 25 26 28c. per lb.
Globe Horse Nails, 23 24 25 26 28c. per lb.	Globe Horse Nails, 23 24 25 26 28c. per lb.
R. R. Spikes..... 5c. by 9-16 1/2c. to 4c. per lb.	R. R. Spikes..... 5c. by 9-16 1/2c. to 4c. per lb.

## LOUISVILLE.

**Mrs. GEO. H. BULL**, under date of Dec. 8, writes us as follows: Market dull and lower. There is considerable inquiry from speculators for round lots for cash, but at figures much below the time rates. The usual time, four months, is allowed on quotations below:

HOT BLAST CHARCOAL.	
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15,823 tons, of the value of £312,862, against 19,661 tons, of the value of £375,680, in October last year.

Unwrought copper exported during the month was less by about 7600 tons, and wrought, less by 1600 tons. The value of unwrought copper was less this month by £32,075 than it was in the corresponding period last year. On the 10 months' transactions there is also a considerable falling off.

Bronze exports were higher by 1581 tons, and the excess in value this October over last amounted to £16,661. In the 10 months the increase was nearly 6000 tons, and the increased value about £69,000.

In steam engines and machinery there has been a decrease on the month's, but a slight increase on the 10 month's, trading. The value of the steam engines exported last month was £230,051, against £297,180 in the like month last year. In other descriptions of machinery the value of exports last month was £676,515, as compared with £885,468 in October last year. For the 10 months, however, there has been an increase from £4,473,361 to £5,850,470.

The increase in railway passenger carriages is considerable, that on the month amounting to £14,323, the augmented value of the 10 months' trading being £94,101. But to counterbalance the increase there is a falling off in the profits on railway trucks. The decrease on the month's trading is £22,694, but that on the longer period only £4594.

Iron gives statistics showing the weekly shipments of iron during this and the two preceding years, thus:

Week ending.	1873.	1872.	1871.
Jan. 4.	5,701	7,311	6,456
" 11.	11,068	10,016	7,865
" 18.	9,386	8,887	8,533
" 25.	11,300	10,070	7,695
Feb. 1.	8,570	10,203	9,349
" 8.	11,537	10,301	10,501
" 15.	8,020	12,078	7,787
" 22.	12,312	14,388	8,582
Mar. 1.	12,144	16,951	8,698
" 8.	12,434	17,832	13,466
" 15.	14,504	19,506	13,644
" 22.	12,030	16,440	18,356
" 29.	11,167	21,729	19,011
Apr. 5.	15,275	16,343	17,665
" 12.	20,104	26,381	18,019
" 19.	15,128	25,101	17,007
" 26.	18,996	23,117	18,468
May 3.	9,102	26,866	17,518
" 10.	14,090	22,378	21,766
" 17.	17,493	23,560	22,830
" 24.	17,175	18,806	20,300
" 31.	16,880	22,196	16,103
June 7.	14,300	20,153	16,101
" 14.	13,127	21,630	15,820
" 21.	12,287	19,904	19,876
" 28.	12,287	16,721	17,290
July 5.	11,690	19,221	17,187
" 12.	11,230	20,324	23,330
" 19.	9,865	17,108	19,101
" 26.	11,084	20,561	17,662
Aug. 4.	10,197	14,494	18,597
" 11.	8,066	17,341	20,210
" 18.	10,717	15,532	19,423
" 25.	10,018	14,814	13,986
Sept. 1.	12,290	17,741	13,874
" 8.	16,699	15,709	14,955
" 15.	11,477	14,139	21,455
" 22.	8,864	14,018	16,173
" 29.	12,073	13,707	20,862
Oct. 6.	11,805	12,071	16,379
" 13.	15,492	12,251	17,968
" 20.	12,650	12,368	21,892
" 27.	11,450	12,916	19,900
Nov. 3.	13,358	13,946	18,948
Total.	581,894	766,156	705,590

Metals are quiet. Messrs. Von Dadelzen & North, in their weekly report, say that Copper has declined. Late on Friday last the lowest point was touched, viz., 279 for Chill bars, and £290 for Wallaroo. On Saturday there was nothing done, but during the last few days there has been a better feeling, and fully 2000 tons of various kinds changed hands. Chill bars firm, £280 to £282, cash, and £282, 10/- to £284, two and three months. Wallaroo £290 to £292, cash, and £291 to £294, three months, closing with buyers. English quiet, but unchanged in value. The charters for the first fortnight of October were telegraphed last Tuesday as 1600 tons. Stock on the coast given as 5200 tons. Tin has undergone a serious decline, caused by the reduction of £4 in the standard of ores, late last week, coupled with pressing sales on the part of old holders. Straits has given way to £116 to £117, cash spot, and for forward delivery £115. A sale for arrival was made as low as £114; and a sale of 1000 slabs Billiton, to arrive, reported at £121. In Holland, also, the market has been dull. Banda spot 709, and for spring sales 688. to 699. Billiton, 67½; English dull, £120 to £123. Tin-plates very dull, and difficult to quote near prices. Lead has maintained its value well, £23 to £24, 5/- Spelter: Nothing officially reported, but if sales were pressed lower prices would have to be accepted. We quote Silesian £26, 10/- Quicksilver, £21 nominally. P. S.—Scotch pig-iron closes 109; Chill bars, £283, 10/-; Wallaroo, £294.

### London Metal Market.

(From The Mining Journal.)

	ton.	£.	s.	d.	ton.	£.	s.	d.
Copper—	ton.	£.	s.	d.	ton.	£.	s.	d.
Best Selected.	94	0	0	0	92	0	0	0
Tough Cake & Tile.	94	0	0	0	92	0	0	0
Sheathing.	96	0	0	0	102	0	0	0
Bolts.	104	0	0	0	108	0	0	0
Bottoms.	102	0	0	0	108	0	0	0
Old.	95	0	0	0	96	0	0	0
Burns Burn.	90	10	0	0	91	10	0	0
Wire.	0	1	0	0	0	1	0	0
Tubes.	0	1	0	0	0	1	0	0
Brass—	ton.	£.	s.	d.	ton.	£.	s.	d.
Sheets.	0	0	0	0	0	0	0	0
Wire.	0	0	0	0	0	0	0	0
Tubes.	0	0	0	0	0	0	0	0
Yellow Metal Sheathing.	0	0	9	0	0	0	0	0
Sheets.	0	0	0	0	0	0	0	0
Spelter.	ton.	£.	s.	d.	ton.	£.	s.	d.
Foreign on the spot.	27	10	0	0	28	0	0	0
To arrive.	0	0	0	0	0	0	0	0
Zinc—	ton.	£.	s.	d.	ton.	£.	s.	d.
In Sheets.	28	0	0	0	29	10	0	0
Spelter—	ton.	20	0	0	21	0	0	0
English Blocks.	122	0	0	0	0	0	0	0
Ditto Bars (in brls.)	122	0	0	0	0	0	0	0
Ditto Bedded.	122	0	0	0	0	0	0	0
Bands.	117	0	0	0	118	0	0	0
Straps.	118	0	0	0	117	0	0	0
Tin Plates—	ton.	£.	s.	d.	ton.	£.	s.	d.
1C Charcoal.	1 qual.	1	16	0	1	18	0	0
1C	2 qual.	1	12	0	2	14	0	0
1C	2 qual.	1	14	0	1	19	0	0
IX	2 qual.	2	16	0	2	19	0	0
1C Coke.	1	8	0	0	1	19	0	0
IX	1	18	0	0	1	19	0	0
Canada Plates.	1 ton.	21	0	0	21	19	0	0
at works.	20	0	0	0	21	0	0	0
Iron—	ton.	£.	s.	d.	ton.	£.	s.	d.
Bars, Welsh, in London.	12	5	0	0	—	—	—	—
To arrive.	12	10	0	0	18	0	0	0
Nail Rods.	12	10	0	0	—	—	—	—
Nail Rods, Staff'd in London.	12	10	0	0	—	—	—	—
Bars.	12	10	0	0	—	—	—	—
Bands.	14	10	0	0	—	—	—	—
Bands at Works.	12	0	0	0	14	0	0	0
Hoops ditto.	18	0	0	0	15	0	0	0
Sheets, single.	15	10	0	0	16	0	0	0
Fig. No. 1, in Wales.	5	0	0	0	6	10	0	0
Bars, common ditto.	11	5	0	0	11	0	0	0
Do, merchant, Tyne or Tees.	11	5	0	0	11	10	0	0
Ditto, Railways, in London.	19	5	0	0	11	10	0	0
To arrive.	30	0	0	0	21	0	0	0
Fig. No. 1, in Clyde.	5	5	0	0	7	0	0	0
Ditto, f.o.b., Tyne or Tees.	4	10	0	0	5	10	0	0
Ditto, N. & E. f.o.b.	25	10	0	0	25	0	0	0
Railway Chairs.	12	10	0	0	14	0	0	0
Spikes.	12	10	0	0	14	0	0	0
Indian Ch'cock Pigs in London.	10	0	0	0	13	0	0	0
Steel—	ton.	£.	s.	d.	ton.	£.	s.	d.
Sheets.	21	0	0	0	—	—	—	—
Ditto (hammed or rolled).	21	0	0	0	—	—	—	—
Ditto, in faggots.	24	0	0	0	25	0	0	0
English spring.								





FINE WIRE—NET PRICES.	
High Brass.	Low Brass. Gild's and Copper.
10. 26.	0.41
27.	0.44
28.	0.48
29.	0.50
30.	0.52
31.	0.54
32.	0.56
33.	0.58
34.	0.60
35.	0.64
36.	0.68
37.	0.72
38.	0.78
39.	0.82
40.	1.15
41.	1.28
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43.	1.58
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**Metallurgical.**

MAYNARD & VAN RENSSLAER.  
CONSULTING  
Mining and Metallurgical  
ENGINEERS,  
Experts in Iron and Analytical Chemists  
94 Cliff Street, NEW YORK,  
George W. Maynard. Schuyler Van Rensselaer.

THOMAS M. DROWN,  
Analytical Chemist  
And Consulting Metallurgist,  
1123 Girard Street, Philadelphia.

**TO CAPITALISTS.**

The subscriber will sell exclusive rights, for separate States, to manufacture Wrought Iron and Steel by his patent processes, and take payment in part interest in the business, and will erect Blast furnaces and Wrought Iron and Steel works when required (for manufacturing by his processes), upon the most approved models in this country and Europe.

The processes produce "from ordinary coke pig iron the purest iron ever made," and which is equal to the highest class Swedish and Norwegian Irons for Cast Steel and tools, and to Low Moor Iron for engineering purposes, and at less than one-half the cost of those irons.

He can refer to manufacturers and consumers of the highest standing, and to scientific tests by the best authorities.

JAMES HENDERSON,  
30 Broadway, NEW YORK.

**The Iron-Masters' Laboratory.**

Exclusively for the Analysis of Ores of Iron, Pig and Manufactured Iron, Steels, Limestone, Clays, Slags & Coal for Practical Metallurgical Purposes.

No. 339 Walnut Street, Philadelphia.

J. BLODGET BRITTON.

This Laboratory was established in 1866, at the instance of a number of practical Iron-masters, expressly to afford prompt and reliable information upon the chemical composition of the substances above mentioned, for smelting and refining purposes. The object being to make it at once a convenient, practically useful, and comparatively inexpensive adjunct to the Furnace, Forge and Rolling Mill.

**CHARGES TO IRON WORKS.**

or determining the per cent. of pure iron in an ordinary Ore.....	34 00
For the per cent. of Pure Iron, Sulphur and Phosphorus in do.....	12 50
For each additional constituent of usual occurrence.....	1 50
For those of unusual occurrence or difficult to determine, the charge must necessarily depend upon circumstances.	
For determining the per cent. of Sulphur and Phosphorus in Iron or Steel.....	12
For each additional constituent of usual occurrence.....	4 0
For the per cent. of Carbonate of Lime, and Insoluble Silicious Matter in a Limestone.....	10 00
For each additional constituent.....	2 00
For the per cent. of Water, Volatile Combustible Matter, fixed Carbon, and Ash in Coal.....	12 50
For determining the constituents of a Clay, Slag, Coke, or of an Ash of Coal the charge will correspond with that for the analysis of an ore.	
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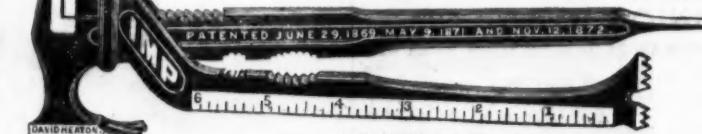
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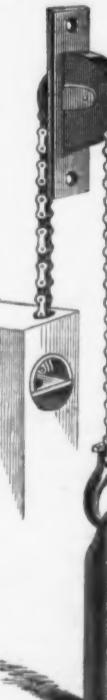
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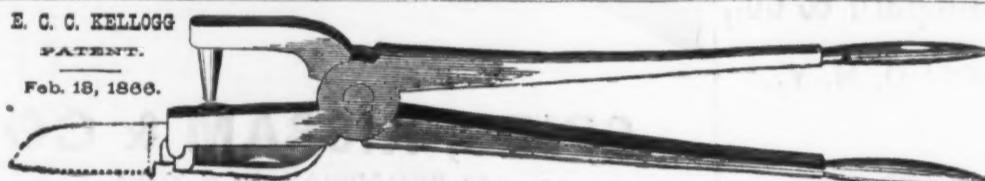
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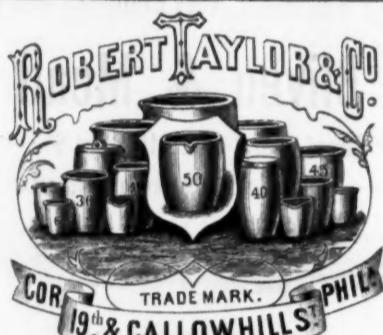
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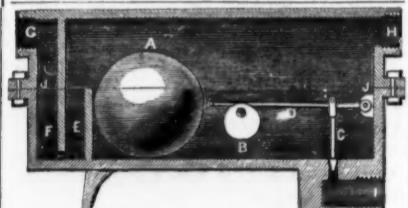
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Morton's.	dis 15 %
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Other makers' Light.	dis 60 10 %
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Cast Loose Joint.	dis 25 %
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Table Hinges and Back Flaps.	dis 25 %
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Ausable.	27 28 29 30 32
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" B. & B. Club Blued Top.	2 50
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" B. & B. Nickel Plated.	10 50
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Flat Head, Brass.	dis 20 1/2c
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Plated Rogers' A No. 1.	dis 30 & 10 %
Skates—Hussell and Black.	dis 25 %
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Squares—Steel and Iron.	new 50 %
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CLASSES 1, 21, 22,  
Great Exhibition of Industry,  
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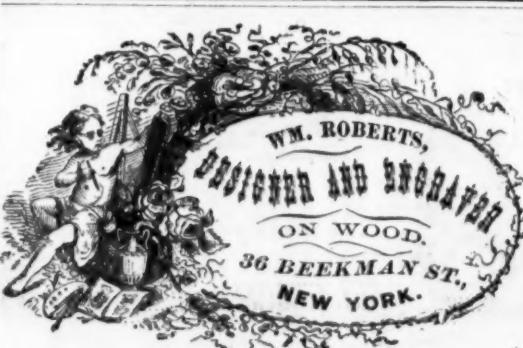
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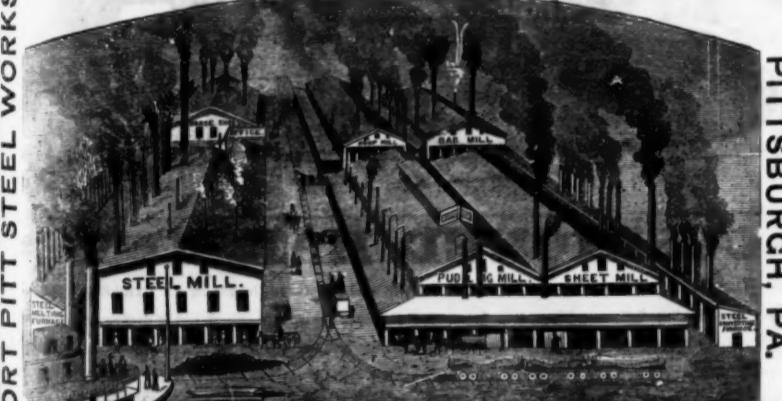
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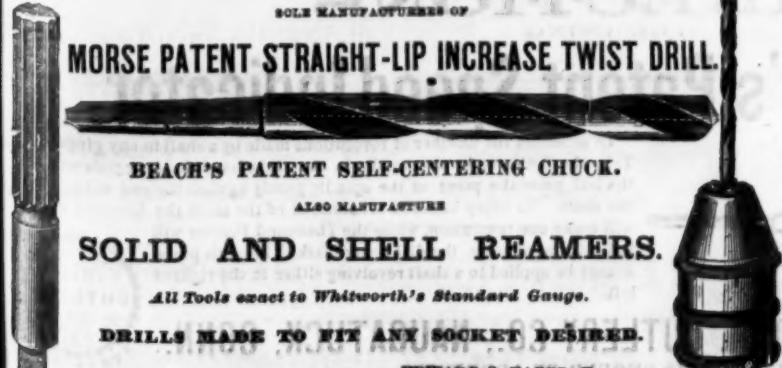
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Wood ..... dis 20

Brick ..... dis 20

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Chisels—Butcher's Tanged Firmer ..... dis 30

" Large Firmer ..... dis 30

Witherby Socket Framing ..... dis 30

" Firmer ..... dis 30

" Corner ..... dis 30

" ..... dis 30

Coffee Mills—

Box 4 Iron ..... dis 25 Box 5 Cast Steel ..... dis 10

" 10 ..... dis 25 Side 50 ..... dis 10

" 12 ..... dis 25 ..... dis 10

" 14 ..... dis 25 ..... dis 10

" 16 ..... dis 25 ..... dis 10

" 18 ..... dis 25 ..... dis 10

" 20 ..... dis 25 ..... dis 10

" 22 ..... dis 25 ..... dis 10

" 24 ..... dis 25 ..... dis 10

" 26 ..... dis 25 ..... dis 10

" 28 ..... dis 25 ..... dis 10

" 30 ..... dis 25 ..... dis 10

" 32 ..... dis 25 ..... dis 10

" 34 ..... dis 25 ..... dis 10

" 36 ..... dis 25 ..... dis 10

" 38 ..... dis 25 ..... dis 10

" 40 ..... dis 25 ..... dis 10

" 42 ..... dis 25 ..... dis 10

" 44 ..... dis 25 ..... dis 10

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" 102 ..... dis 25 ..... dis 10

" 104 ..... dis 25 ..... dis 10

" 106 ..... dis 25 ..... dis 10

" 108 ..... dis 25 ..... dis 10

" 110 ..... dis 25 ..... dis 10

" 112 ..... dis 25 ..... dis 10

" 114 ..... dis 25 ..... dis 10

" 116 ..... dis 25 ..... dis 10

" 118 ..... dis 25 ..... dis 10

" 120 ..... dis 25 ..... dis 10

" 122 ..... dis 25 ..... dis 10

" 124 ..... dis 25 ..... dis 10

" 126 ..... dis 25 ..... dis 10

" 128 ..... dis 25 ..... dis 10

" 130 ..... dis 25 ..... dis 10

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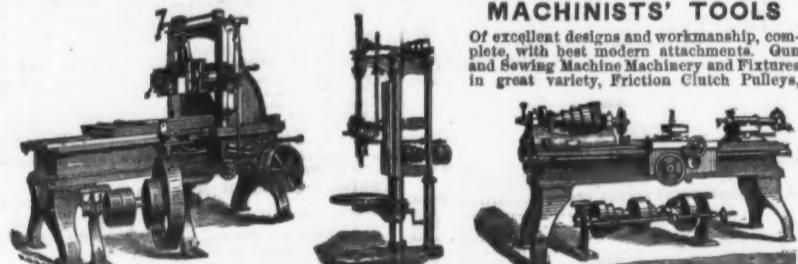
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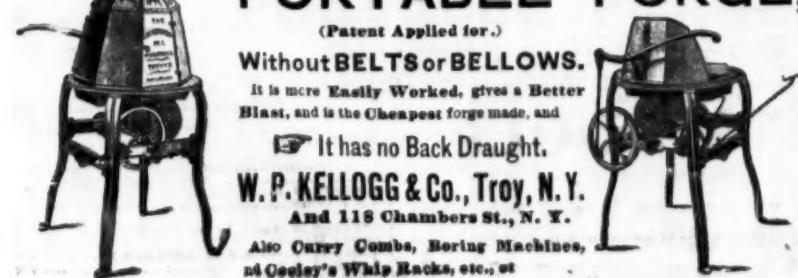
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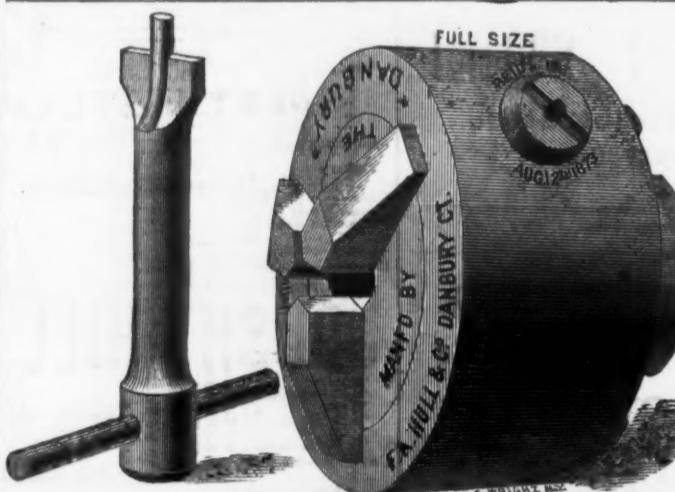
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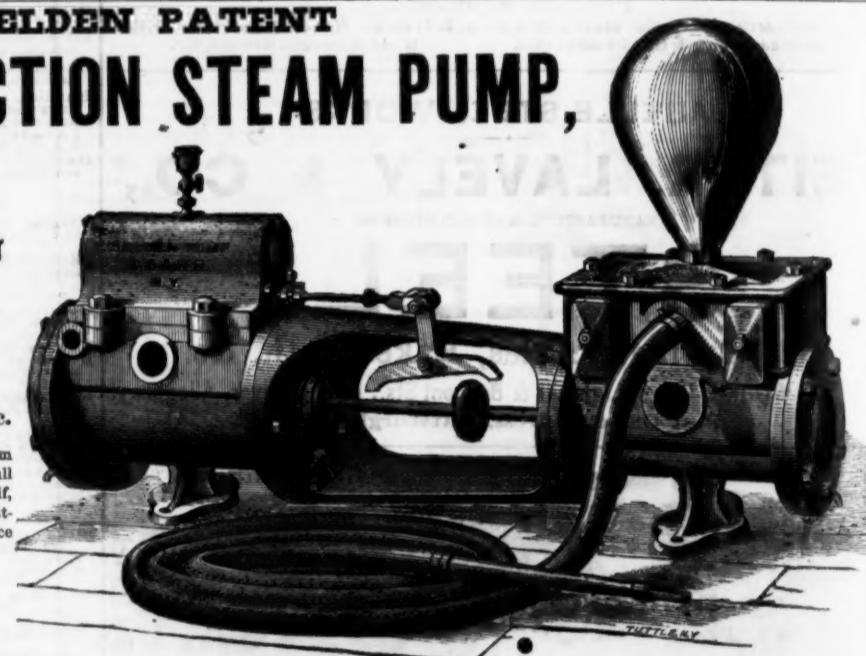
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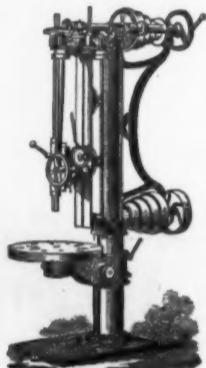
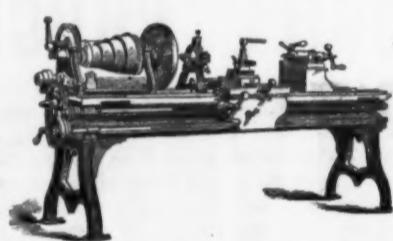
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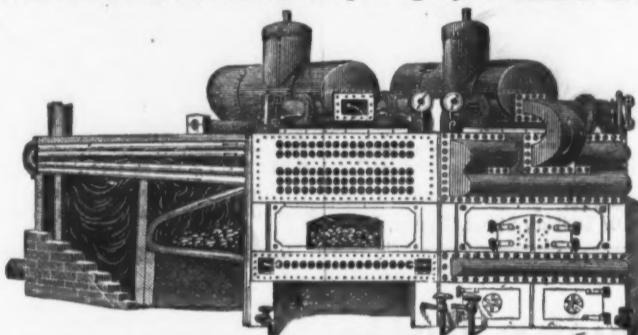
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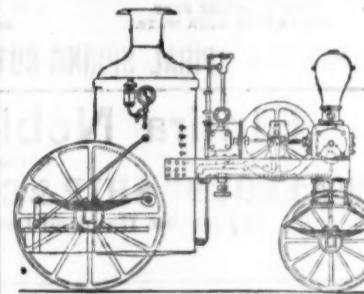
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